The Builder.

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Competition Design for Hereford Town Hall.—By Messrs. Bateman & Bateman and A. Hale :—
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New College, Scarborough.—Messrs. Hall, Cooper, & Davis, Architects ..... *Double Page Photo-Litho.*
Proposed Country House, N. Devon.—Messrs. Baillie Scott & Seton Morris, Architects ..... *Single Page Ink-Photo.*
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The London Sewage Problem.

THE third report by Dr. Clowes and Dr. Houston on the "Bacterial Treatment of Crude Sewage" has recently been published by the London County Council, and is a comprehensive "red-book" of seventy-eight pages, with four full-page plates and nine coloured diagrams. It contains much new matter in addition to summaries of the experiments previously recorded, and affords food for thought to those who have claimed to purify crude sewage by simple filtration. The three reports and supplement taken together contain records of a very large number of tests, both chemical and bacteriological, which have been made with crude London sewage, and with effluents from primary and secondary filter-beds, and show clearly that, while filtration of crude sewage effects a considerable, though not satisfactory degree of chemical purification, it is of little use in destroying bacteria whether pathogenic or otherwise. Obviously a process of purification which depends for its success on the purifying action of bacteria must provide a suitable soil for their multiplication, and in the preliminary stages of the process the absence of any reduction in the number of bacteria need not be regarded with any feeling of dissatisfaction, but such a feeling may well arise when the *final* effluent is proved to be (bacteriologically) practically identical with crude sewage slightly diluted. The same kinds of bacteria and spores are present, the only difference being, as a rule, a slight reduction in numbers.

The report is entitled "Bacterial Treatment of Crude Sewage," but this is, perhaps, somewhat misleading. The attempts which were made to filter crude sewage proved unsuccessful, as the filter-beds were rapidly choked by particles of straw, chaff, cotton, and woollen fibres, &c., and, as we pointed out in our issue of April 7, 1900, the result of these experiments might be regarded as "a confirmation of the usual method of bacterial purification, which includes sedimentation and initial purification in tanks before the sewage is passed on to the filters." In the more recent experiments, a rough process of sedimentation was adopted, and has proved of great service in preventing the choking of the beds. Various methods have been tried, including (1) passing the sewage through tanks, and (2) letting it flow along troughs in which cross-divisions were fixed from the bottom to about half the height of the flow. In the supplement to the second report, it was stated that the experiments with the sedimentation-troughs were to be continued, but this does not appear to have been done; perhaps the authors of the experiments came to the same conclusion as ourselves—namely, that they were not likely to prove of much value. Instead of the troughs, tanks have recently been used, the flow being continuous, but in one series of experiments the tank remained nearly full during the emptying and aëration of the bed, and fresh sewage was passed continuously into it only during the filling of the bed. In these cases—to quote the words of the third report—"probably most of the liquid which passed into the coke-bed was therefore settled stale sewage, which was displaced by the incoming sewage." It is admitted that "some anaërobic (septic) bacterial action undoubtedly took place in this settling tank," and that there was "a considerable evolution of inflammable gas," but it is somewhat strange that the advantages accruing from the use of the tank are not fully stated. This omission we will attempt to supply.

The filter-bed was of coke, and had an area of 26¾ square yards, a depth of 13 ft., and an initial liquid space equal to 51 per cent. of the total contents of the bed. In all filter-beds a certain amount of settlement takes place, and the loss of liquid capacity in the bed under notice must in part be ascribed to this. When unsedimented sewage was used, the liquid capacity decreased from 51 per cent. in February, 1899, to 34 per cent. in June, and 28 per cent. in October. A wooden tank was then placed on the top of the bed, and the crude sewage was pumped into this and allowed to overflow. "The result of this rough settlement," we are told, "was that by January 12, 1900, the liquid capacity had increased from 28 per cent. to about 33 per cent." This conclusion is scarcely warranted, as the bed was not filled from December 22, 1899, to the date on which the liquid capacity was measured, and the increase of capacity was probably due to the three weeks' rest which intervened. We venture to think that the utmost which can be claimed for the wooden tank is that it checked to some slight extent the rate of choking of the bed. This view is supported by the continuation of the experiments from January 15 to April 5, 1900. On the latter date "the coke was . . . . seriously clogged upon the surface, and . . . . the bed had to be stopped in order to give time for the collection of matter in the upper part to become removed by bacterial action."

A rest of four weeks was therefore given to the filter, and on May 2 work was again commenced, but the crude sewage was passed through a brick settling tank in the manner already described, instead of through the wooden tank. The capacity of the brick tank was about 8,000 gallons; the liquid capacity of the filter on June 16 was 6,000 gallons (about 33 per cent. of the total capacity). This series of experiments was continued till July 28, and "no clogging of the upper parts of the coke has been noticed, and the liquid sinks readily into the coke-bed as soon as it is allowed to pass upon the surface." When the wooden tank was used, the bed was filled on the average 10·3 times per week, and the degree of chemical purification effected was 52·5 per cent. When the brick quasi-septic tank was used, the bed was filled on the average fifteen times per week, and the degree of chemical purification effected was 56·1 per cent. The brick tank therefore prevented choking, and improved the effluent of the bed, even though the rate of filtration was increased 50 per cent.

It is somewhat surprising, therefore, that further experiments with a proper septic tank have not been carried out. This thought appears to have struck Dr. Houston. He thinks it conceivable that the bacterial

processes now in operation, which "aim at allowing certain bacteria or groups of bacteria to gain the ascendancy by a *natural process of selection*," might be improved by adding to the sewage "pure cultures in large amount of selected microbes," and suggests that experiments to this end might be divided into two stages—"the first aërobic, or semi-anaërobic, the bacteria used belonging to the class of putrefactive aërobes and facultative anaërobes; and the second stage purely anërobic, the micro-organisms involved in the process being those of nitrification, or, *preliminary to the above, and as an initial stage, anaërobic bacteria might be employed.*" The words we have printed in italics are very suggestive.

We need only state briefly some of the more important conclusions which may be drawn from the chemical analyses. The experiments with the 13-ft. bed lead Dr. Clowes to the conclusion that "there is no reason why a deep bed should not give as good results as a shallow bed, provided that it is as well aërated during the periods when it is empty." This proviso is the crux of the problem, and he therefore adds that experiments have proved that "even the bottom of the 13-ft. bed was well supplied with oxygen." Experiments were made with primary coarse beds and secondary fine beds. The average purification effected with crude sewage was as follows :—

Primary bed, coke	22·5	per cent.
„ ragstone.....	20·6	„
Secondary bed, coke	63·2	„
„ ragstone.....	49·1	„

The materials used in the primary beds were passed through a 4-in. mesh and rejected by a ½-in. mesh. The pieces were therefore of large size, and a further series of experiments with pieces which had passed a 2-in. mesh and had been retained by a ½-in mesh, increased the average purification effected by primary beds to 43·8 per cent. In this series, however, the filtering material was 9 ft. 9 in. deep, against 5 ft. in the first series. Of the secondary beds of this increased depth, the "coarse" bed (½-in. to 2-in. pieces) produced an effluent with an average purification (calculated on the crude sewage) of 62·5 per cent., while the "fine" bed ($\frac{1}{16}$-in. to ½-in. pieces) yielded an average of 76·2 per cent. These experiments show clearly the advantages of double contact. The filtration of the effluent from the chemical precipitation tanks, however, effected an average purification of slightly over 80 per cent., calculated on the crude sewage.

The second division of the report is by Dr. Houston, and deals with the bacteriological part of the question. We need not describe in detail the various experiments which he carried out. The broad facts are that the effluents from the filter-beds contained large numbers of bacteria and spores of bacteria of the same species as those found in the crude sewage. Particular stress is laid on the enumeration of *Bacillus Coli* and the spores of *B. enteriditis sporogenes*. The former is an organism abundant in the intestinal discharges of animals, and, although not classed as pathogenic, serves as an index of the possible presence of more dangerous organisms from the same source. The second bacillus is also found in excremental matters, and appears to be the cause of acute diarrhœa. Both these microbes were found in large numbers in the effluents, even when primary and secondary beds were used. Special search was also made for streptococci, and Dr. Houston considers this series of tests to be of "extreme value" for four reasons, which may be thus stated :—

1. Streptococci are as a class among the most pathogenic of the bacteria yet known.

2. They are delicate germs, and very readily lose their vitality and die.

3. They are present in the intestinal discharges of animals.

4. They are absent from water and soil, unless these have been recently contaminated.

Dr. Houston's experiments showed that "there did not appear to be any significant alteration in the number of streptococci as the result of the bacterial treatment of the raw sewage."

Some mice inoculated with broth cultures of streptococci from the effluents died in a few days; others were apparently unaffected. It is clear, however, that many of these delicate but dangerous organisms survived the rough process of sedimentation, and single and double filtration, and Dr. Houston now throws doubt on his previously expressed opinion that "some, at all events, of the pathogenic organisms are crowded out in the struggle for existence in a nutritive medium containing a mixed bacterial flora, their vitality being weakened or destroyed by the enzymes of the saprophytic species." The final "biological conclusion" at which he arrives is undoubtedly startling, and shall be stated in his own words :—"In view of these results, only one conclusion seems possible, namely, that however satisfactory the process may be from the chemical and practical point of view, *the effluents from the bacterial beds cannot be reasonably assumed to be more safe in their possible relation to disease than raw sewage slightly diluted but otherwise unaltered in its bacterial composition.*"

It must not be forgotten that the bacterial treatment adopted in these experiments differs in some important particulars from the methods generally recommended, but Dr. Houston appears to think that, no matter what known bacterial process is adopted, the effluent will be biologically unsatisfactory. It is strange, he says, that "many still consider the effluents from coke beds and in general from bacterial processes non-pathogenic." We may here point out that the results obtained in these London experiments are much less satisfactory than others obtained at Exeter and elsewhere. Dr. Houston himself has shown that the number of spores of *B. enteriditis sporogenes* present in crude sewage (1,000 to 10,000 per c.c.) was reduced by the Ducat filter to 10 per c.c. In the London experiments, the number in the effluent was "usually less than in the corresponding samples of crude sewage," but "the reduction was not very well marked, and was not, moreover, a constant feature." The actual number remaining in the effluent from the 13-ft. coke bed was usually at least 100, but less than 1,000 per c.c. The unsatisfactory nature of the London effluents, both chemically and bacteriologically, is to a large extent due to the faulty method of treatment and to the makeshift apparatus, and it is scarcely fair to use these experiments in wholesale condemnation of all bacterial processes. The London experiments were made with the specific object of discovering a rapid process of treatment which would produce an effluent sufficiently free from impurities to be discharged into the tidal waters of the Thames without creating a nuisance. A high standard of purity is, under such circumstances, unnecessary.

More thorough treatment is clearly required for inland towns, and this can be obtained by initial purification in a tank, followed by double or even treble filtration as recommended by the Manchester experts, or by the still more differentiated system of filtration adopted by Mr. Scott-Moncrieff at Caterham. In exceptional cases it may even be necessary to precipitate the sewage or to sterilise the filtrate by means of chemicals, but even those present no insuperable obstacles. Dr. Houston's report will be of service in drawing attention to the difficulties and possible dangers of bacterial treatment, but need not be regarded as by any means an unanswerable condemnation of it. Indeed, Dr. Houston himself recommends that the bacterial process should be adopted for London sewage in lieu of chemical treatment; "it would be idle to deny its value or attempt to minimise its usefulness simply because it falls short of a standard of absolute perfection."

NOTES.

The New Government Offices.

We reprint on another page the letters which have appeared in the *Times* from three members of Parliament — Mr. Soames, Mr. Whitmore, and Lord Balcarres—protesting against the carrying out of the new Government Offices by the Office of Works. Every one who is interested in our public architecture ought to be grateful to these Members of Parliament for taking the trouble to raise the question, though we fear they are in a very small minority in the House of Commons, where such subjects are mostly considered of no account. It is noticeable also that the *Times*, which could afford a leading article on the subject of the widening of Piccadilly in support of the views of its correspondents, has nothing to say on this more important subject. The *Times* is a faithful representative, in these matters, of the spirit of the English public, which can get up a great deal of ardour on the subject of a street improvement and the cutting down of trees, but can take no interest in the question of the adequate carrying out of a great work of architecture. However, we hope the subject will not be allowed to drop just yet.

The Widening of Piccadilly.

The objections which we were the first to make to the proposed widening of Piccadilly by taking a strip off the Green Park, as involving the sacrifice of trees without any real relief to the pressure of traffic at the two ends of the widened portion, have been followed up by numerous correspondents in the *Times*, who have given expression to the same opinions. Sir E. J. Poynter, in a letter at once practical and artistic in its spirit, observes that the trees along the Green Park margin of Piccadilly give a peculiar charm to that portion of the street; "they are the survival of a time when London was a less hideous Babel than it now is, and linger there as a reminder of a past and more tranquil condition of life"; and the promise

that eleven of them will not be cut down will not, he is sure, satisfy the public. The scheme is altogether an absurd one, which will spoil that part of London and at the same time be of no avail whatever in removing the real block of the traffic, which occurs at the west end of the Green Park where north traffic crosses Piccadilly from Park-lane. In respect of this part of the question, Sir J. Wolfe Barry, in a letter in Thursday's *Times*, revives the proposal for a sunk road under Piccadilly, and this is the only way in which the block of the traffic near Hyde Park Corner can be relieved. This proposal for a sunken road was made many years ago by the present Editor of this journal, in a letter which was published in the *Builder*, accompanied by a plan, at the time when the ill-advised removal of the Constitution Hill arch was first proposed. It was there shown that the arch might be retained in its original position, and a road taken under Piccadilly and under Constitution Hill into Grosvenor-place. This would have done all that was wanted, without destroying the perspective of Piccadilly by removing the arch and making the present shapeless and inconvenient open space.

The Housing Problem in Parliament.

THE discussion of the Estimates on Monday gave an opportunity for some desultory remarks on the subject of the housing of the working classes. There was on the part of the Government another indefinite suggestion that a Bill should be brought on to improve the existing law, and on the part of the public, represented by Sir J. Dickson-Poynder, the complaint that the time for the repayment of money borrowed by Local Authorities should be extended. The Government, though willing enough that posterity should pay for the war, are very stringent guardians of the rights of posterity in the matter of local loans, and we do not for a moment expect to see the period over which the repayment of local loans is spread increased. A suggestion by this same member that when railway companies take land for improvements, and have to rehouse a number of the working classes, they should, instead of building themselves, hand a lump sum over to the Local Authorities for this purpose, is well worth considering. Railway companies have their own special business to manage, and it would certainly seem more reasonable from every point of view that the rehousing should be done by the Local Authority, who are accustomed to deal with this matter.

The Improvement of English Roads.

MR. LONG'S reply to the deputation which he received last week on the subject of the improvement of roads was not very sympathetic. But in truth the proposal of the deputation that the Central Government should take over the main roads was not practical. In theory there is a good deal to be said for it. But in this country the care of the highways has, from time immemorial, been a local business, and at present the desire of every one is to decentralise as far as possible. Therefore, to discuss the question of a Governmental control of the highways is a mere waste of time. What is desirable is that the County Council should become the sole highway authority in each county. In some counties they have, by a stretch of the meaning of main roads, obtained almost complete control of the highway system. A short Act of Parliament, by which they would be constituted the only highway authority, would be a decided, and at the same time a practical, step towards the continued improvement of English roads. Mr. Long was quite justified in saying that the condition of the rural roads had lately improved, but it is by the existence of the County Councils rather than of the District Councils.

The Leeds Churches Bill.

THIS measure has been finally passed through all its stages by the two Houses of Parliament. It provides for the redistribution of certain ecclesiastical parishes and districts within the borough, and for the building of a new parish church—to replace St. Edmund's—on the borders of Roundhay and Moortown, and of a new parish church, instead of St. Paul's, in the present parish of St. Luke, Beeston-hill. The last-named church, together with the vicarage house, and those of St. Stephen, Burmantoft, and St. Philip, are to be pulled down; the proceeds of the sale of the sites and materials will be devoted to the purposes of the new churches and their endowments. St. Stephen's Church was built in 1853-4, at a cost of 3,000*l.*, after the plans and designs of J. Dobson. The architect of St. Philip's Church (1846-7) was R. D. Chantrell. The fabric, which cost about 5,000*l.*, has a nave of five bays with clear-story and aisles; on the south side is a tower with an octagonal ribbed spire; the nave and chancel have hammer-beam roofs. St. Paul's Church, standing in Park-square, was built of stone, in 1791-3, for 1,175 sittings, at a cost of 10,000*l.*, upon a site given by Dr. Christopher Wilson, who was Bishop of Bristol in 1783-92. At the west end is a portico consisting of a Classical order of four Ionic columns with a pediment. From above it rises a light tower in three stages. The interior was renovated fourteen years ago.

Municipal Telephones.

THE recent public opening of a municipal telephone system at Tunbridge Wells is a notable event in the history of telephony in this country. Several electricians have taken a gloomy view of this new development of municipal trading, and have prophesied that it will be a financial failure. Judging, however, from the enthusiasm with which the ratepayers are supporting the new municipal venture it promises to be a success. The Corporation have powers to supply over an area of about 200 square miles, and they have already obtained 330 subscribers. In Tunbridge Wells the trunk mains are underground, so that the exchange is on the ground floor instead of in the top of the building as usual. The final distribution is done by short spans of wire supported by distributing poles. The system has been well designed and contains many novel departures from ordinary practice, most of which are due to the consulting engineer, Mr. A. R. Bennett. The charges are most moderate when compared with those ordinarily made by the National Telephone Company. For an unlimited day and night service the charge is 5*l.* 17s. 6d. per annum, or if the client desire he can pay a fixed rental of 3*l.* 10s. with a toll of ½d. per outward call, or a fixed rental of 2*l.* 10s. with a toll of 1d. per outward call. Some years ago the National Telephone Company whose charge was 10*l.* was asked to reduce it to 7*l.* The reason given for not acceding to this request was that to work at less than 10*l.* meant working at a loss. However, they have now stuck up notices offering to give any one an unlimited service for a rental of 4*l.* These tactics were successful at Dundee where they first of all reduced their price from 10*l.* to 5*l.*, and then bought up the local company. It will be interesting to see how they answer with the Corporation of Tunbridge Wells. In Glasgow the municipal telephones, although the opening ceremony has not yet taken place, are proving a success, and there are upwards of 1,000 telephones in operation, whilst there are 5,400 names on the books. In Guernsey what is practically a municipal telephone system has been in operation three years, and they are making a profit on an annual charge of only 3*l.* 5s. One of the consequences of cheap telephones in Guernsey is that the number of inhabitants per telephone (forty-four) is less than in any other part of the United Kingdom. Of course, there are many places abroad where the number is very much smaller; in Stockholm, for example, there is one telephone for every eight people. It will be seen that there is plenty of room for enterprise in this direction.

Water for Domestic Purposes.

THE recent decision of Mr. Justice Buckley in what will henceforth be known as the Barnard Castle case has an important bearing on the charge for the supply of water. The question was raised whether the supply of water to a swimming-bath at a school could be considered as supply for domestic purposes, or whether the Local Authority were entitled to charge an extra sum for the amount of water so used. The decision of the Judge was that this water was used for domestic purposes. This decision seems to have a broader bearing than many other judgments, because it appears to enlarge the meaning of the phrase "domestic purposes." The decision of Mr. Justice Buckley was based on the reasoning that the swimming-bath was part of the domestic apparatus of the school; that the bath itself was not kept for the purposes of trade. There is no doubt a growing feeling in the community in favour of the largest and most unlimited and cheapest supply of water possible. Nothing is more paradoxical than that medical and sanitary experts should be continually preaching the need of cleanliness in habitations as a protection against disease, and yet that in this immense metropolis the cost of water should make its complete use almost a luxury.

St. Helens, Isle of Wight.

FROM a Report to the Local Government Board upon the sanitary circumstances and administration of the urban district of St. Helen's, Isle of Wight, by Dr. H. Timbrell Bulstrode, it appears that the supply of water is procured under very unsatisfactory and unsafe conditions. On St. Helens Green there are numerous wells sunk, presumably in the gravel. Some of these wells have pumps attached thereto; others are furnished with means for lowering and elevating a bucket.

"The pumps were at the date of my visit out of order, and the water supply of St. Helen's was being largely drawn from these wells, the covers to which were off in every instance, and thus the well

water was not protected against surface pollution. Moreover, there was no means of reaching water from these wells other than by the use of private buckets, the introduction of which into the water was to be condemned, seeing that they might have previously been utilised for undesirable purposes or have been brought from houses wherein was infectious disease. It did not appear to me that the District Council had taken proper precautions to prevent the continuance of this dangerous practice, which had clearly been in vogue for a very considerable period."

Dr. Bulstrode's Report also states that the drainage system is in an unsatisfactory and backward state, a great deal of it being taken by clay-jointed pipes, and many of the water-closets being without flushing apparatus, and having to be flushed by hand. As the Report says, "There is still a large amount of work to be done in the St. Helens Urban District before that district can lay claim to have modernised itself in a sanitary sense."

The Broad Sanctuary.

IT is to be hoped that the opening of the piece of the Broad Sanctuary on which Canning's statue stands and the placing of seats there, which has been promised by the Commissioner of Works, will be done without delay. It will not only form an agreeable and shady spot in the present hot weather, but the removal of the railings will give a sense of space and freedom which the interesting space at present lacks. A great change in the character of the railings which surround many of the open spaces of London is much needed. In too many instances they have a prison-like character which is far from pleasant. The removal of the heavy rails on the drive of Hyde Park from the Marble Arch to Apsley Gate has greatly added to the spaciousness of that part of the Park. No one who has compared the confined look of St. James's-square, with its high and unsightly railings and its dense mass of unflowering shrubs, with the more open character of Berkeley-square, cannot but regret that more freedom is not given to the open spaces of London.

The German Chapel Royal, St. James's Palace.

CONCURRENTLY with some changes that are being effected of the number and status of the King's chaplains and with a reduction of the ecclesiastical establishment of the Court, the German services at the Chapel Royal, St. James's, have been discontinued, the final service at the Lutheran Hofkapelle having been celebrated on Sunday, 4th inst. The present building, which stands on the east side of Friary-court, had its origin in the Roman Catholic chapel which Charles I. established at St. James's Palace for Queen Henrietta Maria, and which was afterwards appropriated for the uses of Charles II.'s consort, Katharine of Braganza. Soon after the Restoration, Cardinal Philip Howard, the Queen's lord-almoner, installed a community of Portuguese Capuchin friars in a new building adjacent to what was then known as the Queen's Chapel, wherein, as Pepys records, Queen Katharine attended mass for the first time on September 21, 1662. Pepys also describes a visit he made to the friars and their new buildings in January, 1667. After King William III. had ascended the throne the chapel was assigned, by name of the French Chapel Royal, to a congregation of Huguenot refugees; and then, during the following reign, it was taken for the Lutheran services established at St. James's by Queen Anne and her consort, Prince George of Denmark. An interesting survey of the palace and convent which is appended to the rare pamphlet entitled "A Full Answer to the Depositions . . . concerning the Birth of the Prince of Wales. The Intreague thereof detected . . . London, 1689," shows "a burying place" where is now the open space of Friary-court, the "cloisters" abutting against the east end of the chapel, and "Friary Garden" lying between the cloisters and the wall of St. James's Park; on the north of the chapel are the dormitories and the entrance into the convent. The "Great Yard next St. James's Park" on the south side of the chapel and the "Friary Garden" are now covered by the garden of Marlborough House. In August, 1708, the Duchess of Marlborough's trustees obtained, for a payment of 2,000*l.* and a yearly rent of 5*s.*, a fifty years' lease of the Friary and its grounds; in 1709 that lease was cancelled in favour of another one, which included two acres (with the aviary) then known as the Royal Garden. Vardy removed the remaining conventual buildings in 1748, and about one hundred years afterwards was laid out the road which opens out of Pall Mall, passing Friary Court and the chapel, into the Mall, St. James's Park.

Verandahs.

THERE is a common saying that a man who is his own lawyer has a fool for his client. We are inclined to think that this might even apply to the person who is his own architect. A good example of the foolishness of amateur advice appeared in the *Daily News* of Saturday last. In a special article on the keeping of houses cool, which contained much sensible and much needed general advice, it was stated that the best external means of keeping a house cool was a verandah; the next, outside shutters or blinds. But there is a fatal objection to a verandah or any permanent protection from the sun in this country, because it keeps away light at all seasons of the year. A room to which a verandah is attached in England nearly always is disagreeably dark and gloomy and often damp, while the verandah itself requires constant painting, and unless covered with creepers is usually unsightly. Modern architects, whatever their shortcomings may be, have rightly appreciated that verandahs are objectionable, and they are now seldom seen except in houses of the end of the eighteenth and beginning of the nineteenth centuries. If the writer had dwelt, as we recently did, on the paramount importance of outside shutters, whether solid or rayed, and of outside blinds, he would have done more good than by referring to the exploded verandah.

OPEN SPACES.—Now that the garden of Finsbury-circus has been opened to the public by the City Corporation it is proposed that they should similarly acquire the enclosure of Finsbury-square, which was laid out by Dance the younger, who built the houses in the interval 1777 (west side)—1791 (south side). The garden of Finsbury-circus, which extends over one-and-a-half acres, is remarkable for the number and variety of its trees and shrubs; amongst them are walnut, apple, and mulberry trees, limes, planes, elms, the Indian bean tree, several kinds of poplars, acacias, and birches, together with lilacs and laburnums, the bladder senna tree, golden privets, garden willows, the sophora japonica, yuccas, and the eucalyptus.—On July 28 was opened a public park, thirty-two acres in area, at Tipton, which has been acquired at a cost of 10,000*l.* as a recreation ground.

THE ROYAL ARCHÆOLOGICAL INSTITUTE AT NOTTINGHAM.

(*Continued*).

THE morning of Friday, July 26, was devoted to the annual business meeting of the Institute, which was held in the Exchange Council Room, under the presidency of Sir Henry H. Howorth. The Secretary read the annual report, which showed that both financially and in other respects the Institute was in a flourishing condition. Various suggestions were made as to the place of next year's meeting, Worcester, York, and South Wales being advocated amongst others. Eventually the selection was left to the Council. On the proposal of the President a resolution was passed pointing out the desirability of printing the Chartularies of Rufford and Welbeck Abbeys and of the Priory of Newstead.

At the conclusion of the proceedings the party journeyed by train to Mansfield on a visit to Hardwick Hall. Immediately after luncheon at Mansfield a tremendous downpour of rain prevented a start being made, but eventually the journey was resumed only a little after time. On arrival at Hardwick Hall the party was most graciously received by Lady Louisa Egerton in the great hall, after which Mr. J. H. Gotch, F.S.A., read a paper on the history of the building. "Hardwick Hall," he pointed out, "is a building of considerable interest to the student of English domestic architecture, inasmuch as it is a good example of one manner of the Elizabethan designers, and it has undergone no very serious alterations since it was built. It has suffered, like most houses of that time, from age and from the changing fashions of its inhabitants; but such changes as it has experienced have been in comparatively small matters; so that in the general disposition of its plan, and in its external appearance, it remains to-day very much the same as when the eye of its founder, Bess of Hardwick, last fell upon it. This Bess of Hardwick was a notable personage, a woman of great ability and strong will; and being possessed of considerable wealth, she left her mark upon the times in the shape of several large houses, of which this is one, and the only one surviving, the others being Chatsworth (which has been rebuilt) and Oldcotes. She was the daughter of John Hardwick of Hardwick, and was born in the old hall, of which the ruins still remain in front of this house, and near the brow of the hill. That she was a woman of great ability and personal attractions is sufficiently proved by the fact that she married four husbands and survived the last. Her first husband was Robert Barley of Barley. Her second was Sir William Cavendish of Chatsworth, ancestor of the present Duke of Devonshire, the owner of Hardwick. Her third was Sir William St. Loe, and her fourth was George, Earl of Shrewsbury. It was after her marriage to the last named that she built Hardwick Hall, since her initials, E.S., and a coronet form a conspicuous part of the ornamental balustrade on the towers. The date usually assigned to the house is 1576. There is a chimney-piece in one of the bedrooms dated 1588, another in the dining-room dated 1597, and the door of the room called after Mary Queen of Scots is dated 1599. The new hall and the old hall stood side by side, and both were in use for many years. The old hall is, indeed, not much older than the new. Much of it has disappeared, but judging by what remains its general disposition was symmetrical, its windows, as can be seen, are mullioned and have rectangular lights; its whole appearance points to a date about the middle of the sixteenth century. Tradition gives this house as the birthplace of Bess in 1520, and perhaps a careful search might reveal indications of a building of that date. But if anything of it still survives, it certainly would seem as though the old house had been modernised during the second half of the sixteenth century, an additional proof being the remains of a plaster frieze, with figures modelled in relief, of the same character as the frieze in the presence chamber of the new house. Having been thus brought up to date, the old house was not left to immediate decay in consequence of the erection of its rival, for we learn from the ingenious Mr. Collins, who quotes Bishop Kennet's memoirs of the Cavendish family, in his account of the Dukes of Devonshire, given in his 'Peerage,' that one room was of such exact proportion and such convenient lights, that it had been thought fit for a pattern for a room in Blenheim House. This,

therefore, brings us well into the eighteenth century before the old house fell to ruin. It is not unlikely that the older house was the more comfortable of the two, for Hardwick Hall can hardly be considered as a model of convenient planning. It belongs to that species of house of which a large number were built in Elizabeth's days: a house designed as an exercise in symmetry rather than as a dwelling. True, it contains the apartments which were then considered essential, but they are arranged with less than the usual care to secure comfort and convenience. What must strike every one who first sees Hardwick is the great size and number of the windows. This has given rise to the well-known jingle, 'Hardwick Hall, more glass than wall.' It is a fault common to many of the houses of the time, and one which Lord Bacon protested against in his oft-quoted complaint that 'You shall sometimes have fair houses so full of glass that one cannot tell where to become to be out of the sun or cold.'

The fact that windows were so large and plentiful is one of considerable interest and significance, for it emphasises the complete change which had come over house-planning in the space of a few years. Thirty or forty years earlier windows were somewhat jealously introduced, especially on outer walls, for the necessity for defensive precautions had then hardly ceased. Here at Hardwick, however, no thought of defence is apparent, everything is done to procure the largest amount of light and air. The windows, in fact, are overdone; they make the circuit of the walls with relentless symmetry; and not a few of them have been blocked up inside in order to render the rooms habitable. Some of them were shams from the outset, and have fireplaces against them, and not a few of them are crossed by floors, so that the lower lights belong to one story and the upper to another. That is what comes from trying to carry out a preconceived idea, namely, that of absolute symmetry, instead of making the convenience of the house the first consideration.

The room called after Mary Queen of Scots, which is situated high up on the second floor in one of the projecting turrets, has three of its sides on the exterior filled with windows; on the inside, however, only one side is lighted, the fireplace occupies the second side and the bed the third. The room is called after Mary, and has the arms of Scotland over the door, but there is no record of the exact length of her residence in semi-captivity in this house. She was for seventeen years under the care of the Earl of Shrewsbury and Elizabeth his wife, and towards the end of that time her attractions bade fair to rival those of the redoubtable Bess herself, so that, according to old Fuller, when Queen Elizabeth inquired of the Countess how her guest did, that lady replied: 'Madam, she cannot do ill while she is with my husband, and I begin to grow jealous, they are so great together.' Fuller adds that in consequence of this intimation Elizabeth, who disliked anything approaching to a friendship between Mary and so great a peer, gave her into the custody of others. Mary was beheaded in 1587, and as the door of her room is dated 1599, the probability is that it was adorned in her memory, evidently not for her own proper delectation. But leaving the gossip of history, let us look a little more closely into the architectural character of the building. Attention has already been called to the symmetrical character of the plan. The house consists of a large oblong with two projecting turrets on each of the long faces and one on each of the short faces. The door, as usual, is in the middle of one of the long sides, but the hall into which it gives access is not disposed in the fashion which had been customary up to this period, and which still prevailed in most Elizabethan houses. That fashion is followed in the halls of colleges: it placed the hall lengthways with the building; at the entrance end a strip was cut off by a screen and became a passage, called the 'screens'; the front door was at one end of this passage, the doors of the hall were in one side of it, and the doors to the buttery and kitchen department were in the other. The hall was lighted by windows along the sides, and at the opposite end from the screen was the dais with its bay window, and beyond this end were the family rooms. Here, at Hardwick, the hall, instead of being placed lengthways with the building, goes across it from side to side. Instead of it being lighted down the sides, it is lighted at the ends; the front door, instead of being in the end of the 'screens,' is in the middle of one side of them, while at the ends were the doors to the servants' department and also the buttery hatch, all of which are now built up. This unusual disposition may not seem of much importance, and it may be said that although the hall lies differently in relation to the house, yet all the usual features are there, the screens, the buttery hatch, and so forth. But the difference of arrangement nevertheless is indicative of a momentous change, and one which distinguishes mediæval houses from modern. Up to Elizabeth's time, and even James I., the hall was the centre of the family life; it lay between the family rooms and those devoted to the servants. The dais end, with its bay-window, was reserved for the family, and there they dined; adjacent to this end were the parlour and the staircase leading to the bedrooms and other principal chambers. But already the custom of dining in the hall was falling into desuetude, the family sought smaller and more private rooms. With their withdrawal the character of the hall changed, and it tended to become no longer a living-room, but an entrance-hall or vestibule for passing traffic. This alteration of character became thoroughly established in the time of Inigo Jones, and has remained to the present day.

One of the tests of the age of a house is the disposition of its hall; in mediæval times it was a living-room, in modern times it is a vestibule. The hall at Hardwick, owing to its plan, is leaving the mediæval type and approaching the modern. It may have had a dais, but probably not. Even if it had, that end had not the snug feeling of the old-fashioned arrangement, with its bay window and the fireplace fairly close to the seats of the chief personages. It must have been somewhat uncomfortable, as on each side of that end is a passage leading to a principal staircase. I have said 'staircase,' but indeed Hardwick may be said to have no 'staircase'; it has, instead, long flights of steps. By 'staircase' is meant a special feature, either of wood or stone, such as is the pride of most Elizabethan houses. There were very few stone staircases in English houses of this period; Burghley House has, so far as I know, the only good example. But there are hundreds of splendid wooden staircases, and in a house of the pretensions of Hardwick one would have expected to find a particularly fine specimen. But throughout the house the detail is disappointing; everything is large and coarse, including chimney-pieces and doorways. It is rather in its general disposition and the size of its rooms that Hardwick is interesting. When one comes to examine the work closely there is an absence of that fancy and fertility of design which distinguishes the better class of work of that period. But although the means of getting upstairs are not very interesting, there are some fine rooms to go to. There seem to be no family rooms on the ground floor, unless they have been turned from their original purpose. All the principal apartments are on the upper floors, and as each story is unusually lofty, the whole height of the building is much greater than was commonly the case. The hall itself is two stories high, and the only access from one half of the house to the other on the first floor lies across the gallery over the screens. The principal rooms on this floor are those now called the dining and drawing-rooms; in addition to these there are a few bedrooms and various small apartments, contrived to meet modern requirements. The finest apartments, however, are on the second or top floor, where we find the presence chamber and library and the long gallery, besides a fine bedroom and the room named after Mary Queen of Scots. Above these rooms, and partly in the roof, are a number of subsidiary bedrooms. The presence chamber is a large and lofty room, with a very deep frieze of modelled and coloured plasterwork representing hunting scenes. The quality of the work is not very high compared with what was being done in Italy and France at the same time, but it has considerable vigour, and imparts a fine and stately character to the room. Over the chimney-piece in the library adjoining is an alabaster panel of very considerable merit, representing Apollo and the Muses. The long gallery occupies the whole length of the east side of the house, and is a lofty and handsome room. It is the only apartment which retains its original ceiling, and as the ceilings of Elizabethan houses exhibited some of the most original and attractive work of the period, Hardwick suffers much from their absence. This particular ceiling, however, has no special claim to admiration; it is one of the plainest and least interesting with which I am acquainted. In this respect it is only in keeping with the rest of the detail of the house. The long gallery was one of the characteristic features of our Elizabethan house. The longer the better, designers of the day used to think, and although this is of considerable length, being 166 ft. long, there were several houses in which the gallery was longer still, reaching to as much as 200 ft. and 250 ft. The rigid symmetry of the external treatment has already been referred to. It is as complete in its way as that of Wollaton, but the latter house derived more than symmetry from the classic proclivities of the day. It also obtained the pilasters and niches with which its walls are adorned. Hardwick has none of these, and is an example of the fact that they were by no means necessary, although they were a very constant ingredient in the design of the period. The treatment of the windows here resembles in some degree that employed at Wollaton, or, rather one should say, Wollaton followed Hardwick to a certain extent. In both places there is a projecting moulding or architrave which makes a framework round the window, and rests at the bottom upon a projecting sill, which is supported by small brackets. The mouldings of the jambs, mullions, and transomes, however, differ in the two examples. The cornices which divide the various floors have only a general resemblance, and the balustrade which crowns the walls is as meagre in the one house as the other. The finish of the turrets here is not so ambitious as at Wollaton, as instead of an elaborate curly gable, there are only the Countess's initials and coronet supported by a Dutch flourish, a humble member of the same family which is so conspicuous on the towers at Wollaton.

There are here valuable accessory features which are now wanting at Wollaton, as well as at most of the houses of that time which have come down to us. I mean the garden walls and lodge. The lodge was almost as much a part of an Elizabethan home as the great hall and long gallery, but being of small size and detached from the main building, it has in the majority of cases been swept away in favour of some kind of landscape-garden effect. Happily, it has escaped in this instance, and remains, together with its supporting walls, as an example not only of the manner of laying out the approach to an Elizabethan house, but also of the quaint and sometimes unworkmanlike way in which artificers treated their materials. In looking at the laying out of Hardwick the visitor must beware of confusing the original arrangement with the excellent garden laid out by Lady Louisa Egerton on the south side, which, by the lapse of time, has assumed an appearance admirably in keeping with the house. In conclusion, I desire to leave the domain of architecture for an instant to call attention to the great amount and excellent preservation of the tapestry which clothes the walls, and vividly illustrates this method of decorating them, and also to the interesting furniture which survives in considerable quantity. These two things reconcile us to the absence of fascinating architectural detail, and help to make Hardwick one of the fine examples of a large Elizabethan house."

After a cordial vote of thanks to Mr. Gotch for his excellent paper, the party was conducted over the house by Lady Louisa Egerton, who pointed out the chief of the many features of interest, such as old pieces of furniture, the pictures, and the priceless series of tapestry hangings. The long gallery is now the only room retaining its original moulded plaster ceiling; but Mr. Micklethwaite was of opinion that the "presence chamber" once had one to match the moulded and painted plaster frieze, despite the absence of a cornice. The question of the nationality of the alabaster panel in the library, representing Apollo and the Muses, was referred to Mr. Hope, who thought that the cartouche with the initials "E. R.," and the treatment of the Royal arms, pointed to an English origin. After a hurried glance at the fast-crumbling ruins of the old hall close by, the return journey was made to Mansfield, and thence by rail to Nottingham.

At the evening meeting in the Exchange Council Room, Mr. E. W. Brabrook, C.B., F.S.A., read a paper on "Robin Hood," an ever-popular hero, whose history existed principally

in ballads. Some denied that Robin Hood had any real history, but Mr. Brabrook dissented from the view that he did not exist in the flesh. There was a strong English flavour about the ballads, and he did not see why it should be doubted that they had some foundation in fact.

Early on Saturday, the 27th, a special train conveyed the members to Newark, where the ruins of the castle were first examined, under the guidance of Mr. John Bilson, F.S.A. It was first built, he said, by Alexander, Bishop of Lincoln, 1123-1147, but of his work only the gatehouse, a good example of unusual size, now remains on the north, and a small portion of the west wall. Half the front towards the river formed part of the great hall, the fine cellar of which still exists in a very perfect state. It is of late twelfth-century work, with an unribbed vault carried by a central row of pillars. Of the keep and other buildings there is nothing left to indicate their site.

The party next drove to Hawton Church, which was described by Mr. W. H. St. John Hope. The western tower, he said, was the work of Sir Thomas Molineux, of Sefton and Hawton, who died in 1491, and whose arms, with those of his second wife, were in the spandrels of the west doorway. To him was also probably due the clearstory and upper parts of the aisles, together with the wooden roofs, but the arcades and aisle walls were of the thirteenth century. The quoins of the Norman nave remain against the tower. But the glory of the church is the beautiful chancel of three bays, with its splendid sedilia, Easter sepulchre, and founder's tomb and effigy, all of richly carved work, built by Sir Robert Compton, lord of Fenny Compton and Hawton, who died in 1330. Some discussion took place concerning the Easter sepulchre, which Mr. Micklethwaite thought might also have been used as a "sacrament house" after the Scottish manner. Mr. Hope also called attention to the rood screen and the old benches in the nave. On the motion of Sir Henry Howorth, a sincere vote of sympathy was passed to the rector, the Rev. R. Washington, who was prevented from being present owing to the death of his wife on the previous day.

After luncheon at Newark a move was made for the Town Hall, where the Mayor, Mr. W. Atter, welcomed the Institute to Newark, and exhibited the municipal insignia and the church plate. Mr. Cornelius Brown read some notes on the history of the plate, which was also described by Mr. Hope, who called special attention to the waits' badges, a good example of a Monteith of 1693-4 with movable rim, and a set of thirteen silver beakers with one common cover, made in 1688-9, in their original leather case. Mr. Bell added some remarks on the church plate.

A visit was next paid to the fine parish church of St. Mary Magdalene, which was lucidly described by Mr. John Bilson. The church of Newark, he said, was one of those given by Robert de Chesney, bishop of Lincoln, 1147-67, to his new foundation of the Gilbertine Monastery of St. Catharine, near Lincoln, and important works were soon after undertaken, of which fragments remain that possibly represent a complete rebuilding on a larger scale. These fragments included the crypt beneath the old east end, now consisting of two bays, forming an interesting study of mid-twelfth century vaulting. The piers of the crossing, which formerly carried a central tower, were also of the same date. The present western tower was begun in 1230 and was designed on a grand scale, but during the work the design was altered, and the tower, which was originally intended to stand clear of the aisles, had aisles carried up to the western face. Mr. Bilson went on to point out the gradual growth of the church, coming to the early part of the fourteenth century when the south aisle was erected and the upper stages of the tower and spire. There was documentary evidence with regard to the south aisle, for in 1312 Archbishop Greenfield granted a licence to Henry of Newark to remove a chantry chapel in the churchyard and to convert the materials to the use of the church, and "the fabric of a certain aisle, which it was proposed to construct anew." This proved the intention in 1312 to build a new aisle, but he thought the work was of a somewhat later character, though it was exactly in line with the extremely fine fourteenth century work found in South Lincolnshire, and especially in the neighbourhood of Boston and Sleaford. The aisle was set out the same width as the nave, designed for a pitched roof, and was probably only just completed before the Black Death of 1349. The effect of the Black Death in Newark might be seen by a licence to enclose a new churchyard. Of the later rebuilding after the plague they had the nave, the north aisle and transept, and a chancel. There was little difference in detail in the work here, in fact, none in the north side until they came to the extreme east end, where there was a slight difference in the mouldings which might indicate a somewhat later date. Documents showed that in 1460 payments were made for church work, and in 1483 Nicholas Cayser bequeathed money to the new building of the chancel "in case it should be built anew." The fourteenth and fifteenth century builders modelled the church into a harmonious whole, working round the parts of an earlier date. The preservation of the early pillars was probably due to the fact that the work was undertaken in sections, and the pillars afforded a convenient point around which it could be carried out. Mr. Bilson went on to speak of the large number of chantries which existed and of the adornments of the church, noticing the reredos, which was completed by Thomas Drawswerd, of York, carver, in 1508, the chantry chapels, the screen, and other features of interest.

After some remarks by Mr. A. R. Bax on the monumental brasses, notably the large Flemish one to Alan le Fleming, 1361, a cordial vote of thanks was passed to Mr. Bilson for his paper.

The party next drove to Holme, where the church was described by the Rev. A. F. Sutton. It consists of a chancel with south chapel, a nave with south aisle and porch, and a western tower with low spire. The greater part of the church was rebuilt late in the fifteenth century by John Barton, merchant of the Staple of Calais, who died in 1491. His tomb, with effigies of himself and wife, with a cadaver under, remains on the south side of the altar, and a rich band of shields of his arms and of other members of his family is carved over the porch. The original screenwork and pews remain throughout the church, though now sorely decayed and whitened with age. Some of the old painted glass is also left, including portions of figures of saints turned upside down to mollify the wrath of the Puritans against superstitious images. The Barton chapel, south of the chancel, has two good niches on either side the east window. Mr. Micklethwaite criticised the staring black mortar with which the north wall of the nave had been pointed after being stripped of its proper coating of plaster. After thanking Mr. Sutton for his remarks, the members returned to Newark and by train to Nottingham.

Monday, the 29th, was devoted to an expedition to Worksop and Blyth. On arrival of the train at the former place, carriages were in readiness to convey the party to Worksop Priory Church, which was described by the Vicar, the Rev. H. T. Slodden. It consists of a fine rich Norman nave of eleven bays, with triforium and clearstory, and two western towers, all of which owe their preservation to the fact that the nave was the parish church. The eastern portion, which was the church of the Priory of Austin Canons founded here in 1103, has entirely disappeared, with the exception of a ruined thirteenth-century chapel, that formerly opened out of the south transept. Some remains of the western range of the monastic buildings are left, and the vaulted outer parlour now forms the vestry. All the old fittings of the church have disappeared, and, as was pointed out by Mr. Hope, a series of large square-headed windows in the south aisle, that lighted the parish choir and altar, were "restored" away by Sir Gilbert Scott in 1845. An alabaster effigy of a lady and two other mutilated figures of William Lord Furnival (*ob.* 1383) and Sir Thomas Nevil (+1406) lie on the floor in the western part of the nave, and might be taken better care of. A move was next made to the fine fourteenth-century gatehouse, a very complete example, with the "casual ward" for the lodging of tramps on the first floor. On the south side of the entrance a small and richly decorated chapel of curious construction has been added to contain some image of peculiar veneration. From existing sculptures of the Annunciation and of the Adoration of the Three Kings, the image was, perhaps, one of Our Lady. Other images of St. William (?), St. Cuthbert, and the Holy Trinity adorn the front of the gatehouse, before which stand the steps and part of the shaft of a cross.

After lunch the journey was resumed in carriages to Blyth, where the church was described by Mr. W. H. St. John Hope. It originally, he said, like the churches at Thurgarton and Worksop, formed part of a monastic church founded for Benedictine monks in 1088 by Roger de Builli as a cell of the Abbey of St. Katharine at Rouen, and owed its preservation, as in the other cases cited, to the fact that it served as the parish church, which was given as part of the endowment of the priory. The monastic part of the church had been utterly destroyed, but the nave and its aisles of seven bays remained, together with a western tower of later date. The nave and north aisle formed part of the first church of 1088, but a slight pause had occurred in the building, since the lower part of the north wall indicated a setting out that was not eventually followed, and the bays of the aisle were now oblong instead of square, as first planned. The early character of the work, in arcades, triforium, and clearstory, was pointed out, but the original flat ceiling of the nave had given place to a thirteenth-century quadripartite vault. The early Norman unribbed vault is left in the north aisle. The south aisle was replaced by another of greater width about 1290, with a wooden roof only, and to it the parish altar seems to have been transferred. The south porch was of the same date. Late in the fourteenth century a new tower was begun within the last bay of the nave, after the manner of that at Furness Abbey, but Mr. Hope said he could see no reason for its being so built here unless the old western boundary of the cemetery had then been close up to the church. The tower seems to have been slowly built by stages and not finished until well in the fifteenth century. Of the fittings the old wooden transverse screens remained, with painted figures of saints, and there were some good seventeenth-century pews at the west end. Several interesting floor slabs remain, and an early Purbeck marble effigy of a knight in flat topped helm with a lozengy shield and surcoat, perhaps a Fitzwilliam.

After a thorough inspection of so interesting a church the party returned to Worksop and thence by train to Nottingham.

In the evening the concluding meeting was held under the presidency of Sir Henry Howorth, when cordial votes of thanks were passed to all those who had contributed to the conspicuous success of the meeting of 1901.

Tuesday, the 30th, was devoted to the final expedition of the meeting. Leaving Nottingham by train at 9·25 a.m. for Aslockton, the members walked thence to Whatton church, where Mr. Montagu H. Hall, in the absence of the vicar, read a descriptive paper by the late vicar, the Rev. T. K. Hall. The church, which is dedicated in honour of St. John of Beverley, now consists of a chancel, central tower and spire, and nave with north and south aisles and porches. A south transept was destroyed in 1808, and the chancel was rebuilt in 1848 and the tower in 1870. The remainder of the building is chiefly fourteenth-century work. There are no old fittings except the font, which is of a curious local type, and dated 1662. The church contains some interesting monuments, which were described by Mr. Hope. The earliest is the effigy of Sir Richard de Whatton, known to antiquaries from the engraving by Stothard, but since restored. The next is an early fourteenth-century of a canon of Welbeck under an arch in the north aisle wall, and a third is a fine alabaster tomb with shields of arms in low relief (partly restored) and effigy of a knight of the Newmarch family *circa* 1380. There is also an incised slab to Thomas Cranmer, father of the Archbishop, who died in 1501. Some interesting fragments of the early effigies of another knight and his lady and of a fourteenth-century village cross with figures of saints are preserved in the north aisle.

The journey was next continued to Bottesford, past the village cross and the stocks and whipping post, to the parish church, the architectural history of which was described by Mr. E. B. S. Shepherd. It was, he said, a building with a complicated story, and appeared to have been built up by degrees in the fourteenth and fifteenth centuries round an earlier church, which it gradually replaced. The chancel had been rebuilt early in the thirteenth century with side chapels of two bays, which had since been destroyed. The fine and lofty tower and spire were of the fifteenth century. Mr. Hope described at length the unrivalled series of

tombs filling the chancel, consisting of (1) a small Purbeck marble effigy of a knight that commemorated the heart burial of Robert Lord Ros at Croxton Abbey in 1285, (2 and 3) the alabaster tombs and effigies of William Lord Ros, K.G. (*ob.* 1414), and his son, John Lord Ros (*ob.* 1420-1), brought here from Belvoir Priory at its suppression; and (4 to 11) the monuments and effigies of the first eight Earls of Rutland and their countesses. There are also two good brasses to former rectors in the floor. The present rector, Canon Jackson, also contributed some historical remarks.

After luncheon the party drove on to Langar Church, an interesting building planned in the thirteenth century, though little of the original work remains. The chief features were described by Mr. Harold Brakspear, F.S.A., and Mr. Hope contributed some observations on the Choworth and Scrope tombs.

The party then journeyed on to Wiverton Hall, on the kind invitation of Mrs. Chaworth Musters, where Mr. Bailey described the ancient gatehouse incorporated in the modern house, all that remains of the mansion built in the reign of Henry VI.

Subsequently the party left for Bingham station and thence by train to Nottingham.

It will be seen that, although the great modern mansions in the Dukeries were not included in the meeting, nor the old home of the Byrons at Newstead Priory, most of the principal ecclesiastical buildings in Nottinghamshire were visited, and a special endeavour was made to include a typical series of the lesser-known churches which are apt to be overshadowed by the greater glories of the minster or ruined abbey. Owing to the dearth of old domestic work, Wollaton Hall was the only important Nottinghamshire house visited, Hardwick Hall being in Derbyshire. The most striking features about the churches are the late character of undoubted fourteenth-century work, and the abundance of monumental effigies, most of which are admirable examples of mediæval sculpture. The near proximity of the homes of the Chellaston "kervers" and the later "marblers" at Burton accounts for the large predominance of alabaster work.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

THIS society held its fifty-fifth annual meeting at Newtown, Montgomeryshire, during the week ending the 3rd inst. There was a smaller gathering of members, and the local residents participated less actively in the excursions than usual. Both circumstances, however, contributed to render the meeting more pleasurable and profitable to the antiquaries who were present, and minimised the difficulties that in practice always crop up in the management of an unwieldy party.

Newtown and neighbourhood for twenty miles round cannot be said to contain any single object of antiquarian interest of the first order, and, indeed, the same may be said of the county of Montgomery generally. Yet there exist within easy distance a number of minor objects that, by reason of their diversity, make the district an eminently suitable one for the operations of an archæological society; and it must be noted that these antiquarian delights are situated amid natural beauties hardly to be equalled, and certainly not surpassed, by those of any other district in the kingdom. The entire county consists of hills and dales, the former growing ever more imposing and the latter ever more romantic as the traveller passes onward from east to west. The Severn pursues a devious course through its central districts from its source upon the slopes of Plynlimmon to its disappearance as a Welsh stream a few miles beyond Montgomery, and wherever it is met between these extreme points its beauties are as fresh as they are varied. Then the woods of Montgomeryshire, what antiquary could resist their charm? Not collected here and there to constitute one of the distinctions of a nobleman's demesne, but scattered broadcast over the whole shire, and clustering most thickly along the slopes of the hills, they are a never-ending source of delight to the tired eye of a town resident. These manifold natural attractions are in many spots around Newtown disposed in such exquisite and harmonious combinations that the historical student is altogether tempted to forget the influence these physical features have exerted upon the rise and fall of tribes and races, and in the gradual evolution of the England and Wales of our own day. In no part of this island can the study of historical geography be more fruitfully followed than in the county of Montgomery.

The visitors commenced operations on Tuesday, July 30, by a drive to a spot now known as Gro Tumps, a short distance to the north-west of Newtown. This is an excellent specimen of the kind of defensive position formed of an artificial mound of earth, the base of which was surrounded by a deep moat. These mounds were, no doubt, crowned by wooden structures which the destructive agencies of time and man have effectually removed. The moats were flooded when a stream could be conveniently adapted for the pupose, or were left dry when water was not at hand. To these strong but circumscribed holds was attached a flat piece of ground varying in extent as the surface permitted, and surrounded by an earthern wall. The example seen by the archæologists at the outset of their journeyings was the signal for the outbreak of strong differences of opinion, which found frequent expression during the meeting, as to the builders of these structures and the consequent period of our history to which they belong. The late Mr. G. T. Clark examined many of them, and described most of those in the region around Newtown in an able paper, entitled "The Moated Mounds of the Upper Severn," printed in Vol. X. of "Montgomeryshire Collections." From both the architectural and the historical evidence, Mr. Clark came to the conclusion that this class of fortress was constructed by the Teutonic tribes whose amalgamation produced the general terms "England" and "English," and his conclusion has been received without hesitation as having the balance of probabilities in its favour. When advanced by the Ven. Archdeacon D. R. Thomas in an excellent paper upon the fortified posts of the district, read the evening after the visit to the Gro Tumps, Mr. Clark's conclusions were vigorously assailed by Colonel W. E. Morgan, R.E., of Swansea, author of "The Prehistoric Antiquities of Gower," and formerly Director of the Ordnance Survey of Wales, and by Mr. Romilly Allen, F.S.A. Both gentlemen argued ably in favour of the post-Norman origin of these structures. It is clear that the term "Saxon burh," which is frequently applied to them, conveys an inaccurate impression of their builders, for they are found in districts into which Teutonic tribes never penetrated in times to which the structures themselves may be considered as probably belonging. But it by no means follows that they must, therefore, be the work of the first Normans, though their easy adaptability for short sieges, and their usually favourable situation, would, no doubt, cause them to be utilised by that eminently practical people. The mound of Gro Tumps is 40 ft. in diameter at the summit, about 50 ft. in height, and between 140 and 150 yards in circumference at the base. The outer side of the moat was defended by an earthen wall. This earthwork is situated upon the Severn, whence water for the moat was drawn by means of a cross-cut. The bridging of the moat in these fortresses is not always easy of explanation owing to the absence of stonework, but the example seen by the party on this occasion seemed to offer a solution by the presence of a small mound on the outer side of the moat, upon which trunks of trees probably rested. The church of Bettws was the next point of call, and introduced the visitors to a typical example of a Powysland edifice. The churches of the district have for the most part been so ruthlessly restored within quite or comparatively recent periods that it is difficult for a visitor, without further evidence, to judge whether the restoration has followed and preserved the mediæval characteristics of the edifices. The general plan is of the simplest—an aisle and chancel marked off, in most instances, by no architectural division, and a squat western tower. This latter is most usually crowned by a short oaken structure, which in many instances follows and continues the external line of stonework, and is finished by a low roof; in other cases a little diversity is produced by imposing upon the first wooden structure a smaller one, also of oak, forming a true belfry. The exceeding plentifulness of wood and the relative absence of stone is the explanation of these peculiarities, but it is rather strange that greater elegance and grace was not reached in the external use of timber. These towers have, in the main, resisted the restorer; their great strength has kept them uninjured, and their want of height has preserved them from the accidents to which taller and more elaborate towers are subject. Though the church is dedicated to St. Beuno, a Celtic saint of the sixth century, the name Bettws marks it as having been once annexed to one of the great military orders—in this instance that of St. John of Jerusalem, which had a hospitalry at Halston on the Shropshire border. The church contains a brass commemorative of a former vicar, Sir John ap Meredyth, of Powys, who erected it in 1531, during his own lifetime. It is of poor character, but worthy of note as the only memorial of its kind in the entire county. Sufficient of the ancient glass has been worked into the modern windows to prove the superiority of the workmen of old. The parish chest, now inside the tower, has been made from a single oak; it is an example of the magnificent timber for which Montgomeryshire has always been famous, and of the absence of all artistic feeling in its maker. Upon a steep height commanding splendid views over a great stretch of country stands the ruins of Dolforwyn castle. The natural strength of the position no doubt caused it to be selected for the erection of a castle which should form an effective protection to the rich district between this spot and the Salopian plains. Possibly a castle may have risen here soon after Earl Roger of Montgomery had fastened his hold upon the district, but the ruins now visible are those of a fortress of the early thirteenth century. The ability and success of Llewelyn ap Iorwerth, the ablest political chieftain that Wales ever produced, and one of the signatories of Magna Charta, compelled the English barons on the marches, from the mouth of the Dee to the mouth of the Severn, to look to their strongholds. Earlier and more primitive castles, that had hitherto sufficed against the simple methods of warfare of the Welsh, were not sufficient defences against the modes of fighting which they soon learnt from their enemies. It is to this period that we must assign the construction of Dolforwyn Castle, of Dinas Bran near Llangollen, of Tretower, lower down the marchland, and of Grosmont and Skenfrith at the southern end of the Welsh border. During the reign of Henry the Third the Welsh made great advances in their struggle against the English. The latter had to fight hard to keep their ground, and it is to this reign therefore that the construction of the baronial castles along the border is to be attributed. The subjugation of the Welsh by Henry's son, the building of great concentric fortresses from Flint to Harlech, which were centres of political administration as well as impregnable seats of military power, and the growth of the royal resources coincidently with the decline of the baronial power, all contributed to the gradual decline in importance of the strictly baronial holds, and they seem to have been completely dismantled at an early period. Thus in 1387 this castle of the Mortimers is returned as "worth nothing," and in 1398 as "in ruins." So effectual has been the destruction that it is impossible to make out with any degree of certainty the principal parts of the edifice; nevertheless, it should not be missed by a visitor to Powysland.

Tregynon Church has been restored without taste or discretion, and may pass without further comment. Gregynog Hall, the residence of Sir James Joicey, M.P., who has recently acquired it from Lord Sudeley, is a fine residence containing in the dining-room, the only one seen by the party, some beautiful oaken carving, the old portion of which bears the date 1636 upon three heraldic shields. Llanwnog Church is of the usual Montgomeryshire type. Its claim to consideration arises from its possession of a rood screen and loft of beautiful workmanship. The church is undergoing restoration, so that it was difficult for the visitors to inspect this object with the care and attention it deserves. The carving is rich and executed with the greatest delicacy. The west front differs from the eastern face, but the whole is of the same period. It is a very fine example of good Perpendicular work. The window that about a century ago occupied the chancel is now in the north wall; the glass is of the late fifteenth century, and bears a representation of the patron saint attired as a mitred abbot, and with the inscription S'te Gwennoc. From this church the party proceeded to an interesting specimen of Montgomeryshire domestic architecture called Maesmawr, the residence of the now extinct

family of Blayney. Owing to some misunderstanding the visitors were not admitted inside, but were forced to content themselves with admiring the exterior. Powysland is full of similar examples of black-and-white houses, and so many did the archæologists see that one whose *métier* lay in another direction expressed himself as sick of them. Their general plan is an adaptation to a timbered district of the Jacobean style of residence, the effect of the immense oaken beams which are painted black, and the intermediate spaces, which are filled with rubble and plastered white, being exceedingly pleasant.

On Wednesday the party made a toilsome journey to the scene of a defeat inflicted upon Henry III. by the Welsh at a spot called Cwm y Ddalfa, the glen of the capture, when William de Breos, one of the most turbulent barons of his day, was seized. The celebrated Hubert de Burgh, the Justiciar of England, started the erection of a strong fortress in the neighbourhood to curb the Welsh, but, according to the story told by Matthew Paris, was soon obliged to relinquish his design ; whence King Henry III. satirically christened the half-built fortress Hubert's Folly. After climbing to the supposed site of the castle, called Pen y Castell, the tired archæologists unanimously agreed with the king. Continuing their walk they arrived at the spot termed the Moat, in the immediate vicinity of Kerry Church. This is a fine example of the moated mound, and produced a recrudescence of the discussion of the preceding day. Kerry Church is the scene of one of the most interesting incidents of mediæval ecclesiastical life of which we have authentic information, namely, the contest in 1176 between the Bishop of St. Asaph on the one hand and the celebrated Giraldus Cambrensis for his diocesan, the Bishop of St. David's, on the other, for the right of visitation and patronage. The full story of the mutual excommunications pronounced by the respective dignitaries upon the other, the triumph of Giraldus, which he celebrated by ordering the ringing of the bells, "*simul omnes trinc intervallo*," whatever that may precisely mean, are they not related at length in the works and words of the victor ? Time and the spirit of compromise have so far adjusted the matter that the church is now attached to the diocese of St. Asaph, though the more solid advantages of appointment still lie with the Bishop of St. David's. The very edifice that was the occasion of the quarrel may be traced in the larger building of to-day. The church consists of nave and chancel and north aisle, divided by eight rounded arches. The four westernmost piers of this arcade are of the Norman period of architecture ; the arch springs directly out of the pier and has a simple chamfer. At a later period the church was lengthened to the eastward by the construction of other four arcades. The piers of these arches are octagonal, and are finished off with cushion capitals ; the third pillar from the eastern end also bears the ball-flower ornament, and the mouldings of the capitals of the two easternmost piers are more elaborate than the rest. The round arch of the earlier arcade was continued in the later enlargement. The chancel consists of the four easternmost bays of the south aisle, and in the south wall is a piscina of the period of this addition to the original church. The font, which is also of the same date, is octagonal in shape and bears upon its several faces the emblems of the Passion. The windows are modern. There is a western tower, with the usual timbered belfry, and buttresses of the Late Decorated period, but these have been much altered in character at a considerably later period. One of the bells bears the inscription "Sancte Egevire ora pro nobis," though the church is dedicated to St. Michael. The patron saint of Penstrowed, originally believed to have been the mother-church of Kerry, is Gwrie, and it was suggested by Archdeacon Thomas that the form upon the bell is derived from that of the original saint of the entire district. The parish registers commence in 1609. There are monumental slabs to various members of the allied families of Herbert and Long, from the latter of which is descended the Right Hon. Walter Long, who was born at Dolforgan in this parish. After luncheon the party proceeded by train to Welshpool to visit Powis Castle, the Castell Coch or Red Castle of the Welsh chronicles. Architecturally Powis Castle was so completely altered in the seventeenth century that its original features are now confined to the western towers which guarded the entrance into the mediæval castle. There are a few good pictures, and the view from the terrace is superb. Welshpool Church is a spacious edifice, and, though restored within recent years, it still retains the side galleries so dear to the eighteenth century. The nave is of great width, the chancel arch not reaching the southern angle by many feet. A south aisle was added about two centuries ago, no doubt when the galleries were erected. The western tower is heavy and poor in character. Welshpool possesses a small but interesting museum which is now undergoing arrangement by Professor Boyd Dawkins. It contains several carved capitals of Early English design from the dismantled abbey of Strata Marcella a few miles distant, but its principal treasure is an early sanctus bell of what is known as the Celtic type which once belonged to the church of Llangwstenin. The controversy on the pre-Norman or post-Norman date of the moated mounds broke out afresh on a visit to the Tomen (mound), a fine mound, the base court of which has been transformed into a most perfect and restful piece of green turf on which the game of bowls is played.

Thursday saw a visit to another moat, this example being upon the slope of the hills in the parish of Llandinam. It is peculiar by reason that in addition to the usual base court it has a larger enclosure opening out of the first court. This may have been a British camp to which a subsequent race of invaders added one of their own type of structures. To antiquaries desirous of studying this branch of archæology no better example can be chosen than the one here referred to, and it has the merit of accessibility, being only a few minutes walk from the railway junction to which it has given its name of Moat-lane. With the exception of the edifice which occupied its summit, it must be in almost the same condition as when it was first constructed ; the moat is well defined and still contains some water, and the base court and outer enclosure are easily traceable. Llandinam Church has been so thoroughly restored as to present in its structure few objects of interest to the ecclesiastical antiquary. The ancient font, which has found safety in a retired corner, though terribly mutilated, bears sufficient evidence of its Late Norman date. A carved wooden reredos of sixteenth century workmanship is preserved in the church. It is divided into five compartments, the centre panel representing the temptation of Adam and Eve, and the remaining panels having respectively on the left the angel and the lion, and on the right the bull and the eagle, the figures emblematic of the Evangelists. Llanidloes church, which was next visited, burst with the effect of a revelation upon the astonished visitors. Here, in a retired district of Wales, is a parish church that must always have been far too large for the population. Not only so, but the edifice internally is one of the most beautiful in the Principality. It consists of a nave of five bays, a finely proportioned chancel, and a north aisle. The great feature of the building is the imposing arcade of Late Transitional work, developing at the western end into pure Early English, which divides the nave from the aisle. The piers are clustered and have the keel moulding, and were it not for a certain stiffness in the carving of the capitals might be considered a little later in date than they probably are. There has long existed a tradition that this arcading was brought from the Cistercian abbey of Cwmhir about 20 miles distant, at or soon after the dissolution of that monastery in 1536, and after a careful comparison of the fragments still remaining at that place with the work at Llanidloes church, the late Mr. S. W. Williams, F.R.I.B.A., felt no hesitation upon the matter. The timbered roof is also said to have come from Abbey Cwmhir, but as the spans of the two buildings varied considerably this conjecture is certainly erroneous. It is more probable that the people of Llanidloes, having acquired a beautiful arcading for their church, determined to reroof the building at the time when the arcades were erected. The beams are terminated by large shields, one of which bears the date 1542, which would fit in with the hypothesis just advanced. The church is under the invocation of St. Idloes. The north aisle was once decorated with mural paintings, of which not a trace now remains. The corbels supporting the wall-plates are formed of three conjoined billets, but the westernmost four are of exquisitely carved foliage. The east window is a good example of the Perpendicular period ; the windows on the northern side are later, and chiefly square-headed. The tower, as is customary, is at the western end, and is of the local type crowned with a wooden belfry. It batters considerably, and is buttressed at the angles. The string course is carried round the west door as a label. The tower may have been higher than the usual Montgomeryshire examples, indications of a second stage being visible about 6 ft. from the top of the present stonework. The arch leading from the interior into the nave is lofty and pointed. The font, after having been missing for many years, was discovered not long ago in a heap of rubbish and placed upon a modern base ; it is octagonal in shape and ornamented with four circles within a larger circle upon each face. It is of the Early English period. A helmet of the sixteenth century is supported on a bracket fixed to the western end of the nave. The time occupied in the examination of the church compelled the party to give only a cursory glance at the old Town Hall, a black-and-white structure of the early seventeenth century. On the homeward journey a stiff climb was undertaken to the summit of a hill called Cefn Carnedd, upon which are the remains of a fine British camp. The surrounding wall of the camp follows the outline of the hill, the area enclosed being about twenty acres. There were no remains of dwellings within the camp, as is usually the case in the stone enclosed camps of which Carn Goch and Tre'r Ceiri are notable examples, nor were there any indications of the presence of water. It would appear, therefore, that these camps were only used as posts to which a tribe could, with its cattle, retire when attacked by a superior force. The final halt upon a long and fatiguing day was called at Caersws, said to be the site of a Roman station. Though no mention of such a station occurs in the Itinerary, there can be little doubt of the presence of the Romans at this spot. Traces of a square enclosure with rounded corners are plainly visible close to the present railway station, and it is said that during the construction of the railway buildings a quantity of Roman pottery and tiling was discovered. Trifling excavations were made about half a century ago with similar results, and small finds are frequently reported. Influenced by the projected visit of the Cambrian Archæological Association to the neighbourhood of Caersws, the Powysland club determined to make a few trial diggings under the direction of Dr. E. Davies Rees, but the spots were ill chosen, or the fates were unpropitious, for nothing has yet been discovered. Simultaneously, however, with this work, the digging of the foundations for a new house, distant about 100 yards from the line of the camp, was proceeding, and here a large quantity of broken Samian and Upchurch ware was unearthed, together with broken amphoræ and other unmistakable signs of Roman occupancy. Several coins turned up, one of the reign of Vespasian. In the centre of the excavated space a well was discovered completely choked with rubbish. The walling of the well is inferior to that of genuine Roman work, and the greater probability is that it is the construction of the British tribe which entered upon the Roman heritage after the withdrawal of the legions. Caersws seems to be the point of convergence for four or five roads having Roman characteristics, and commands the entrance to several valleys. But the absence of inscriptions forbids the idea that the camp, if it ever really existed, was anything more than a temporary fortification thrown up most probably during the operations against the Ordovices, and abandoned as a military post after the submission of that tribe. On the other hand, there seems no room for doubt that a small colony of Roman civil officials had been planted and continued to reside here until towards the close of the Roman domination. The neighbouring lead mines of Trefeglwys would be almost certainly known to them, and they were much too practical to neglect their development. Cambrian antiquaries cannot be expected to be experts upon the Roman period. The Roman stations in Wales, with the exception of Caerleon, were few and insignificant, and their destruction in subsequent times appears to have been so complete that little has been left to reward the labours and widen the knowledge of the Welsh archæologist. It would therefore appear to be desirable that such an authority as Mr. Haverfield should be consulted upon the finds already brought together by Dr.

Davies Rees before further excavations are attempted.

On Friday the party made an excursion round Newtown, proceeding first to the ruins of the old parish church, beautifully placed on the banks of the Severn. The eastern and western ends, the southern wall, and the western tower are still standing, and sufficiently proclaim it to have been another instance of the local type. It appears, however, to have dated in part from an earlier period than most of the neighbouring churches, and it may well have been the pattern from which surrounding parishes derived their form of edifice. Richard Owen, the social reformer, was born at Newtown, and lies buried here. The very name Newtown postulates the existence of an older community, and history informs us that this earlier settlement was called Llanfair in Kedewen. The town became subject to the great border family of Mortimer, successive members of which fostered its progress by granting important municipal privileges to it at various times. These, most probably, called a new town into existence after complete quietness had been assured upon the Welsh border by the power of Edward I., for we find in a Charter of that King of the year 1321 the style changed into "the new town in Kedewen." The old church just mentioned had possessed a beautiful oaken screen, which, upon the desertion of the church about thirty years ago, fell upon evil days. After much hacking about, part of it was re-erected in the new edifice that had been built at the other end of the town, where it proved offensive to the æsthetic taste of the parishioners. It was again removed, and relegated to a cellar in the vicarage, whence it was disinterred for the inspection of the visitors. The modern church is by the late Mr. Penson. The party next started upon the drive to Montgomery. The Severn is here a gently-murmuring stream, having the highway as companion through the beautiful low-lying ground. Several places of historic fame were passed in the course of the drive, such as the Ford of Rhyd Whiman, a favourite spot for the solemn settlement of disputes between the English kings and the Welsh princes; and, further on, the Ford of Rhyd-y-Gors, the scene of a great Saxon defeat by Gruffudd ap Llewelyn, in 1037, concerning the locale of which Mr. Freeman has made a sad error in his "Norman Conquest." The party soon crossed Offa's Dyke, which in this neighbourhood is easily traceable, and at Chirbury found themselves on English soil. Chirbury is the site of an Augustinian priory, of which almost every vestige has vanished except the nave of the priory church, which, being parochial, was consequently saved from the general destruction. The work of obliteration was so effectively performed at Chirbury that there are now no church records, no parochial terrier, and, so the visitors were informed, scarcely any documents relating to the priory in the British Museum or Record Office. The modern parish council finished what their forbears had accidentally spared, for upon the establishment of the first council and the handing over of the parish books, they were ordered to be destroyed as worthless. The present building consists of nave and aisles, being without doubt the priory church cut off short of the crossing. The period is Early English. The original east window, which is placed in a shallow chancel erected in the eighteenth century, is formed of three plain lancets, and at the western end of the south aisle is a pair of lancets of plain but effective work. The piers of the nave are much out of the perpendicular, but the roof timbers have been secured by iron ties. There is a fine western tower crowned by a timber balustrading. The font is curious; it is circular in shape, with two projections on opposite sides which appear to have been intended as handles; at equal distances between these projections are two others of different character. The chalice, dated 1595, is a very good specimen of the communion service of the period; the cup is of enormous size, of much later date, and the paten is of the late seventeenth century. Portions of the dismantled priory are built into the churchyard walls, and the lower part of a beautiful clustered column, which appears to remain *in situ*, would probably be found to mark the northern transept of the conventual church. A number of mediæval tiles discovered at various periods have been fixed in the porch of a neighbouring house, but though protected by a mat, they should be removed from the many chances of destruction which beset them. A fine library of chained books, which may possibly have been formed in the latter years of the priory, and which was certainly enlarged by the early Protestant vicars, is now at the vicarage. Chirbury is, of course, for ever associated with the sainted Lord Herbert. Lymore is a house about a mile from the town of Montgomery of interest to antiquaries as presenting an example of seventeenth-century black-and-white domestic architecture which has escaped internal renovation or alteration. It has been described and illustrated in an early volume of "Montgomeryshire Collections." Several of the rooms still contain the tapestry with which their walls were covered when the house was in the heyday of its glory. It is the property of Lord Powis, and is maintained as a shooting-box. Montgomery possesses attractions for all sorts and conditions of antiquaries, its stock of show places being so varied as to present examples of the fortified structures of three distinct epochs. Its strategical importance early recommended it to the race which, for better name, we may continue to call the Ancient Briton. The people who built the camps on the tops of the rounded hills of this district and enclosed them with earthen walls must have recognised the suitability of the height now called Ffridd Faldwin for the purposes of a defensive post. They accordingly established one there, whence its masters must have long dominated the surrounding country. Later on came the people whose chieftain favoured the conical mound, the deep enclosing trench, and the outer courtyard. This structure is on a gentle eminence, far below the Briton's breezy camp, yet with a prospect extending many miles in each direction that would remove the danger of a surprise. Next came the builder of the strong stone tower and the scientifically constructed stone wall. Disdaining the sites of his predecessors, he fixed upon a hill intermediate in height between the two. Montgomery appears in Domesday (A.D. 1086) as a castellum. Does this refer to the moated mound, or had Earl Roger of Shrewsbury already commenced operations in masonry? Could we but answer this apparently simple question, we should have gone far towards the settlement of the much-debated problem of the period of the moated mounds. We can at any rate say with confidence that if Earl Roger had selected the site of the present castle and had built his keep ere Domesday was compiled, one of his successors or vassals started afresh in the reign of Henry III. at the structure, the ruins of which exist at this day. The restricted space at the top of the hill was levelled and enlarged by the construction of walls of solid masonry on the sides where the hill fell sharply away. The entrance to the castle was to the north-west, the only direction from which it could be attacked, and a strong keep rose on the northern scarp a few yards from the gateway towers. Beyond this it is impossible to make out the features of the structure, there remaining little else than immense mounds of broken and shapeless masonry. Traces of the outer defences can be observed following the slope of the ground. The final object of the visitors attention was the church of Montgomery, which must have been erected coterminously with or directly after the castle. It consists of nave, chancel, and north and south transepts. The work is of the early thirteenth century, and, though plain, exceedingly good of its kind. A single-light window in the south transept is especially noteworthy, it having light and graceful shafts with capitals, whereas all the other windows of the same period have only the usual rounded and unbroken moulding. The eastern window is good Perpendicular. There is a screen of not very good workmanship which is said to have come from Chirbury Priory. The tower is at the crossing, and is of the massive Llanbadarn Fawr type. Two effigies are preserved within the church, one of a knight of about the close of the thirteenth century, the other a knight of about a hundred years later. There is also the tomb of a Herbert who died in 1600, in the monstrous style of that period.

Small as was the attendance, the present year's meeting was one of the most interesting of the Society's recent fixtures. The programme of work was found too long, and items had to be sacrificed each day. This is so common a fault in the arrangement of such gatherings that expostulation seems useless; it has the humanitarian excuse that it spares the long-suffering horses, and brings the travellers back to dinner at reasonable hours. The address of the president for the year, Lieut.-Col. E. Pryce-Jones, M.P., was a model of what such occasions should produce from gentlemen who do not profess to be themselves learned in the archæology of their district. Nothing could exceed the courtesy of the local honorary secretaries, Mr. R. Williams, F.R.Hist.S., and Mr. Pryce Wilson Jones, nor the general excellence of their management. The hospitality of the gentry of the county of Montgomery is well known to every visitor to the county; it was displayed to an even greater extent than usual towards the party of antiquaries, and was accompanied by such genuine kindness and consideration as to double the gratification of its recipients. Three papers were presented to the evening meetings, one by the Ven. Archdeacon of Montgomery upon the camps and fortified posts of the county, which produced the interesting discussion already referred to; the second by Mr. R. Williams, F.R.Hist.S., on "Dolforwyn Castle"; the third on "Wanten Dyke," by Mr. J. M. E. Lloyd. Perfect weather accompanied the party throughout, and contributed not a little to the complete success of the meeting. There is but one subject upon which a grumble is fairly admissible, and for which the permanent officers of the Association are solely responsible. The members who make it a point of attending the annual meetings are occasionally presented with a programme of the particular district in which they happen to meet that is not only a guide to the antiquities of the district and a compendium of information respecting hotels, trains, postal business, and the like, but is of permanent value to the inhabitants. At other times they receive nothing beyond a meagre list of the places to be visited. The present occasion happened to be the turn for one of the latter productions. Members visiting Newtown for the first time had to find out as best they could the names of hotels, and a few of them who had been unable to procure this local information were doomed to wander from house to house in search of shelter. The programme was accompanied by a sketch-map which was worse than useless, for it was not furnished with a scale of distances. Such a programme is unworthy of the committee of the Association, and, it is to be hoped, will never be repeated.

SANATORIA FOR CONSUMPTIVES.

STATED shortly, the *raison d'être* of a consumptive sanatorium is to provide a centre constructed on the latest hygienic principles, where advantage is taken to the fullest extent of sun and air, to teach the temporary occupants to adequately appreciate these blessings, and so to regulate their lives that they may go forth as apostles of health, carrying their knowledge into their various family circles.

The movement for what is called the open-air treatment of tuberculosis patients has been extensively practised in Germany for many years. As long ago as 1859 a sanatorium was erected in Silesia, at Gorbersdorf, and since then the various German States and insurance boards have actively entered into the scheme, and numerous sanatoria have been erected. Some are in the nature of hospitals, adopting as *part* of their treatment open-air living. Others are in the nature of homes where patients in the earliest stages of consumption are received, and open-air living is the *primary* treatment, seconded by regular discipline in hours of rising from bed, of eating, and retiring to rest, by bathing, by graduated exercise—in short, by living on hygienic lines.

It may be convenient to lay down the main lines on which a sanatorium should be constructed, and in this connexion it is to be borne in mind that it is recognised by nearly all medical men that to get anything like satisfactory results, patients should be admitted in the first stage of the disease. In fact, cures appear to be an inverse ratio to the duration of the disease. We will, therefore, assume that patients enter the sanatorium when first attacked. They are not then incapable of moderate exercise, nor are they expected to be confined to their beds. Of course it may be that temporarily they are weak, and that rest in bed may be necessary for a time.

First as to site. A sandy subsoil should be selected, so that rain may be readily absorbed.

* A paper read at the recent meeting of the British Congress on Tuberculosis, by Mr. Edwin T. Hall, F.R.I.B.A.

Clay is relatively impervious, and a soil with clay not far from the surface gets waterlogged. Evaporation creates ground mists or fogs, which are very bad for consumptives. Again, a low-lying site on sand or gravel is bad, because the subsoil water percolates through the subsoil, and renders the earth moist and cold. This percolation also forces outwards ground air or air charged with carbonic acid gas, a slow poison. The site should, therefore, be elevated, but not on the summit of a hill. The ideal site is the southern slope of a hill sheltered from north and east winds by trees. On sandy soil the trees will generally be some species of pine, the resinous exudation from which is health-giving, imparting a clean and brisk flavour to the air. It is sometimes held that the near presence of sheets of water is objectionable; but that, I think, only applies to ponds and semi-stagnant waters. A rapid river may be beneficial, owing to the exchange of air to which its movements give rise. Witness the case of Nordrach in the Black Forest, where the Harmerbach, coming from the higher lands, passes through the village, close to some of the buildings of Dr. Walther's Colony; or again Harlaching, near Munich, standing on a hill above the torrential Eiser. The life and movement of such waters has a bracing and energising influence on humanity, whether sound or sick.

Given, then, a site on sandy subsoil amid pines, the next thing is to place the sanatorium in an elevated position. It is not good to put it on a flat plain. Shut in by woods, with a strictly limited prospect, the influence on a patient is bad. There is a sense of confinement most depressing to all nervous temperaments. Hohenhonef, not far from Cologne, is high up the mountain, with beautiful and very extensive views of and beyond the Rhine. Nuremberg-Engelthal, in Bavaria, commands a wide stretch of scenery. From Falkenstein, in the Taunus mountains at Cronberg, near Frankfort, the panorama is only limited by power of sight. Dr. Walters' Sanatorium at Crookesbury Ridges, in Surrey, has in a less elevated position also extensive views. Again, there should be a wide clearing on the south side of the building, and in a less degree on the other sides. Admit to building and to gardens plenty of sunlight. The curative value of sunlight, with its germ-destroying power, is immeasurable. The clearing, too, gives the sense of freedom and lack of restraint. The charm of the seaside is largely the gratification of this sense. Another point of great value is to set the building well away from a high road, and in a sandy district this is of especial importance. Dust of any kind is, of course, very bad for affections of the throat or respiratory organs, and the dust from a high road, laden, as it is liable to be, with fœcal matter, and carried about by high winds, is worse than all. Of course, a good water supply is essential. Where a public service is not available, a well should be sunk on the higher side of the sanatorium. It will there not be in danger of contamination from sewage, and, also, once raised to the surface, the water will flow by gravitation to the building—a great saving in expense of maintenance.

Sewage purification and disposal are important matters. I found among the South German institutions—both sanatoria and general hospitals—that it was the common practise to treat the sewage with an infusion of sulphur earth, a natural product of which, I believe, there are considerable deposits near Cologne. The mixing was a very simple process. At Falkenstein the mixture was contained in a closed vessel placed in the outlet chamber of a divided sewage receiving tank. The inlet chamber received the sewage, from which by a screen or tray, paper, &c., was separated. This chamber, at a certain level, emptied itself by a siphon. To the top of this siphon a small pipe from the mixture vessel was attached, and as the sewage passed it drew a charge of the mixture by suction. The effluent was then conveyed from the second chamber to another receiving tank at a distance divided into two chambers, and ultimately to four settling tanks, used in rotation, and after a period ranging from two to four weeks, the liquid was discharged on to the land.

At the Nuremberg General Hospital, which is quite new, a more elaborate apparatus is used. The main drains discharge into a cesspool or receiver, with an outlet trough at the level of the inlet pipe. This trough discharges on to a species of water wheel contained in the central of three open brick tanks. The two side tanks contain the sulphur earth mixture, kept in a state of agitation to prevent precipitation. The rotation of the wheel is arrested as the bucket comes into position under the trough and is filling. While the filling is going on two small streams of the sulphur earth mixture flow in from the sides. The treated sewage then passes over a weir to a channel, with an iron screen over it to catch foreign substances, and thence to two large circular settling-tanks, intended to be used alternately, with funnel-shaped bottoms about seven metres deep in all. Suction-pipes are fixed to near the bottom of these tanks, and the heavier deposit is pumped up to a hydraulic press when the sewage is formed into cakes to be carted away for manure. The liquid from the tanks passes away.

At Harlaching, after similar treatment with sulphur earth, the sewage passes into the rapid Eiser, and I am told all the sewage of Munich passes into the river without ill effects, owing, I suppose, to the tremendous current.

A Nordrach the sewage goes into the ordinary closed cesspool. When this gets full it is emptied by means of a portable enclosed apparatus, probably known to many officers of health and sanitary engineers. Briefly described, this is a cylindrical closed tank, mounted on cart wheels, with a long flexible suction-hose. When the suction-pipe has been let down to the bottom of the cesspool, a charge of chemical explosive expels the air from the cylinder through a valve, and the vacuum is immediately filled with sewage. This is carted away and spread over the land.

I did not hear of any case in South Germany where a septic tank treatment was adopted. In the new sanatorium at Wokingham, in Surrey, there is a septic tank with two or three settling tanks attached, and from these the effluent passes on to the land. Where the sewage can be delivered into a public sewer there appears to be no medical objection to its doing so without treatment. In London the sewage of the large scarlet fever and diphtheria hospitals so passes, and no evil results follow, as was conclusively proved by a Local Government Board Commission.

The great danger from consumption appears to arise from bacilli contained in sputum. When the moisture evaporates these bacilli are blown about and become a source of danger. In all sanatoria provision should be made for dealing with sputum by cremation. At Nordrach each bedroom is fitted with a pair of lavatory basins—one for washing, the other for spitting. It seems to me the waste pipes of the latter must become contaminated, and in any case I do not like the idea of sputum passing into a pipe.

Having now dealt with these general features, we come to a consideration of typical sanatorium buildings.

It will be noted that all that I submit to your notice differ radically in planning. Unless otherwise mentioned, all the German institutions have double casement windows, are heated by low-pressure steam radiators, and are electrically lighted. In some of the latest institutions, as Harlaching and Krailing, the administrative buildings are separate and distinct from those containing patients, but not so in others nor in earlier ones. For example, at Falkenstein, which is the first institution I propose to describe, the kitchens, larders, &c., are in the basement of the block. It must, however, be borne in mind that this institution commenced in what had been a private house, and although by additions it is now a large place, the original house remains part of it. The staff, except the medical men, live in the block.

It will be seen by the general plan that there are detached blocks. Engine and boiler houses, stables for horses and cows, workshops, laundry, &c. The main building, containing a basement and three floors above, one of which is in the roof, consists of a centre block facing E.S.E., with two symmetrical wings at a slightly obtuse angle, enclosing on three sides a terrace garden. To the N.E. is a very large dining-hall opening on the S.S.E. to a wide verandah continued in a N.E. direction to the chief doctor's house, and forming a covered promenade about 65 metres, or, say, 200 ft. long. On the south side a long annexe, with an enclosed verandah or gallery facing west, leads to another doctor's house containing the consulting-rooms, &c. On the east side of the gallery are the gardener's house, mortuary, &c. The total frontage in a straight line measures about 1,000 ft. The sanatorium has accommodation for one hundred and twenty patients of either sex, with seventy single and twenty-five double bedrooms, generally of a large cubic capacity. There are three main staircases. The staff consists of a medical superintendent with three assistants, a managerial staff of four. The total staff, male and female, indoor and out, is ninety-two. There is one waiter to eight or ten patients. There is no regular staff of nurses and no separate accommodation for them. They are only taken in if required by patients. The patients' rooms generally face south or east, but others north and south-west; the majority are in single file on one side of a corridor, but there are several rooms on the other side. There are two slipper baths for patients and a douche-room in the basement. The water-closets are contained in the building. The floors of bedrooms are covered with linoleum; the walls are plastered. There are no rounded angles. The ventilation is by the windows.

The *liegehallen* are attached to the building, forming wide verandahs on the three sides of the terrace at the level of the basement floor, which is above ground on this side. In the grounds there are large open pavilions and smaller summer-houses containing couches, all fancifully and luxuriously appointed, and in the building are winter garden, reading, writing, billiard, and music rooms. Altogether this is a high-class residence, medically conducted, where wealthy patients may live cheerful lives in beautiful air and glorious scenery. It may be worth noting that each patient's serviette is kept in a linen envelope—claimed as a very sanitary arrangement.

Ruppertshain, a few miles distant, near Konigstein, is modern, is for poorer patients, and is more strictly a sanatorium. It is on plan a flat crescent three stories in height, above a basement with two short wings, and accommodates 122 patients—ninety male, thirty-two female. There are no separate administrative buildings, but the kitchen is in the west wing, on the ground floor. There are eighteen rooms with one bed, seventeen with four beds, and six with six beds, of a cubic capacity per patient, for men, of 20 to 30 metres, and for women, of 30 to 40 metres. The staff consists of the medical superintendent, with two assistants, a secretary, and a lady superintendent or matron. There are three female and two male nurses, and twenty-four male and female servants. There are two main staircases from bottom to top. The patients' rooms face south and are in single file, with a corridor on the north side. There are nine slipper baths for the patients and one douche for each sex, all in the body of the building. The floors of bedrooms are of plain uncovered deal boards; the walls and ceilings are of plaster. In the older portion of the building there are no concave angles to the rooms, but in that most recently built all angles are concave except at the floor, where they are most needed. At the ends of the building there are two-storied *liegehallen*, about 12 ft. wide. There are no fireplaces, and the ventilation is by the windows and doors. One of the medical officers, who courteously showed me over the institution, was of opinion that wards with as many as six beds were not so good as those with only two or three. He thinks a few balconies to bedrooms, large enough to take beds, are desirable.

The Nürnberg Heilstätte, Engelthal, a few miles from Henferfeld, is a modern building—a parallelogram consisting of basement, three other floors and then rooms on the gables. There is no separate administrative block of buildings. It affords accommodation for fifty patients in seventeen rooms, two containing five beds, two with one bed, the others having three beds each. The cubic capacity per patient is 40 metres. There is one staircase, which is not sufficient for so high a building with so many residents. All patients' rooms face south, and have a corridor on the north side. Dr. Bauer is the medical superintendent, and has no assistant. There are three female nurses and seven female servants. There are four slipper baths and three douches, all in the body of the building. There are six water-closets for patients, similarly placed. A handsome dining-room faces south, and is served from the kitchen in the basement. The floors are of uncovered deal boards. Walls and ceilings are of plaster and have concave angles, except at floor, which omission the doctor laments. The plastered surfaces are artistically decorated, a feature which I commend to the notice of our hospital authorities. The *liegehallen* are quite detached, one being on the

terrace at the south-west of the sanatorium, the other in the woods. Ventilation is by windows and doors. Dr. Bauer thinks it better not to have more than three beds in a room.

I should like to mention the great attention paid to the details of furnishing in this institution. The bedsteads are simple in manufacture, having footboards of iron covered with linoleum, with spring mattresses. The bed mattress is filled with Kapock, an Indian fibrous material of which Dr. Bauer speaks well. The bedside tables are of zinc, enamelled, with glass tops, and zinc drawers, having rounded ends for cleanliness. In these the soap trays, tooth brushes, &c., are kept. The centre tables in the wards have ash tops unvarnished, and the legs and framework are of varnished deal. There are no drawers to them.

The next building I propose to describe is one of quite another type of plan.

The Städtisches Sanatorium at Harlaching is a few miles' drive from Munich, on the top of a hill, in a fir forest. This building may be described as a hospital. It is primarily for consumptives, but a few other cases of non-infectious character are received. They also make a speciality of dental surgery, and the dental operating room is fitted with every kind of the most modern dental appliances. Accommodation is provided for 212 patients, half of each sex, but the ultimate scheme is to add buildings so as to accommodate 600 patients. Dr. Hermann is the medical superintendent, and there are three assistant medical officers. The remaining staff consists of a manager, a legal clerk, a clerk, and one matron. There are twenty-one female nurses (members of a sisterhood), two male attendants. Of servants there are nine female and eight male, including engineering staff. The hospital is a building E-shaped on plan, three stories in height, with, I am glad to say, no basement rooms. Its main entrance frontage is towards the north. There are twenty-eight wards, six with twenty beds, six with twelve beds, twelve with single beds, and eight isolation rooms, each with one bed, but I think some of these last-named are appropriated for three-bed wards. The cubic capacity per patient is 36·36 metres. There are four staircases, two in the centre and one at each end, and one lift. The windows reach nearly to the ceiling. There are twelve slipper baths and three douches, two slipper and one douche at each extreme angle, all contained in one room divided by partitions. There are eighteen water-closets for patients, badly arranged, each group of three with a slop sink being placed in one room, in the body of the building, with only one window. It is surprising to find such an arrangement in these modern buildings—an arrangement which the medical superintendents all condemn and lament.

The aspect of the wards is as follows :—The twenty-bed wards are axially east and west, with windows north and south. On the south side of the wards, three stories high, are the *liegehallen*, about 12 ft. wide. Dr. Hermann thinks these are very conveniently placed, but too wide, and owing to the fact that they are of solid masonry, arcuated on each floor, they keep off too much sun. Had they been 9 ft. wide with pillar construction they would, he thinks, have been admirable. There are other *liegehallen* in the grounds. The twelve-bed wards are north and south, with windows east and west. The single-bed wards face east or west respectively, the isolation rooms north. The floors of the wards are of concrete covered with linoleum. Walls and ceilings are plastered. No angles are rounded, a fact of which the doctor complains. Ventilation, when windows are closed, is by means of warmed air inlet and by outlet shafts. Time is too short to allow me to describe these in detail. The fresh air is warmed by passing through a case containing a steam radiator, but Dr. Hermann complains that the air so heated is too dry. To me this statement was interesting, because I have always had this objection to steam radiators for heating such inlets. The same result does not arise when hot water is used.

The lighting is by electricity, and all the clocks are electric. The day accommodation for patients is excellent. There are two adjacent dining-rooms in the centre for each sex, looking into the large quadrangles, and a reading-room to the south of these. There are two handsome chapels, one for Roman Catholics, one for Protestants.

The administrative block is north of the anatorium. It is said to be sufficient for the ultimate scheme. The plan is very complete and admirable. There are, however, two points I venture to criticise, and these are :—(1) placing the linen drying-rooms over the washhouse and finishing-room ; (2) placing the disinfector in the basement of the main block. The plan of the whole is a hollow square surrounding an open quadrangle. The south block contains the doctor's and priest's residences. On the south-west is the laundry ; on the south-east are the kitchen, with dining-rooms attached, for female staff, the residences of the assistant-matrons and nursing sisters. The west side contains the residence of the manager, servants, and engineer ; and to the north of these the cow and pig stables, poultry house, &c., with fodder-lofts above. The east side contains the stables, coachhouse, &c. The boiler-house and engineer's department are in the centre of the quad. The rest of the basement contains heating apparatus, disinfector, and very extensive cellarage. The cow-stable is a regular feature at most of the sanatoria, and those I have seen are beautifully kept. The importance of pure milk is evidently fully recognised. I quit the description of this institution with regret. One of the most modern consumption hospitals visited by me, I found it to be full of interest in all kinds of detail, and the many hours Dr. Hermonn kindly gave up to explaining everything are amongst my most pleasant recollections.

We turn to yet another type of plan in the Volksheilstätte Krailing, about half an hour's walk from Planegg, in Bavaria. The whole district is a forest, principally of pines, and the Volksheilstätte is beautifully placed, and seems the ideal abode of rest and seclusion. This is strictly a sanatorium for open-air treatment of men only. It receives 120 patients. Dr. Krebs is the chief medical officer. He has two assistants. The matron does the correspondence, otherwise the institution is managed from Munich. There are twelve nursing sisters and three male attendants. There are twenty-one servants in all, male and female. The sanatorium contains a basement and three other stories. It consists of a central block with two wings at widely obtuse angles, and at the south-east and south-west intersections there are pretty chapels for Roman Catholics and Protestants respectively. There are three patients' rooms containing 109 beds ; thirteen rooms have single beds, fourteen have two beds, six have three beds, two have four beds, six have five, and two have six ; but 120 patients can be accommodated if necessary. The cubic space in single bedrooms is fifty metres, in other rooms from thirty to thirty-three metres per patient. There are two staircases. The doors have fanlights, but not to the ceiling. All patients' rooms face south, and in the multi-bedded rooms there are four with side windows. There is an unobstructed corridor on the north side of the rooms. The kitchen is in the basement of the central block, the dining-room being on the ground floor on the south side, with a sitting-room adjacent. There are four slipper baths in one room on the ground floor, divided by curtains, and one douche room. There are eighteen water-closets, in groups of three, arranged on each floor in one room in the heart of the building with only one window. There is on each of the upper floors a room fitted with lavatory basins on both sides, in all there are thirty basins, the best accommodation I have seen in any sanatorium. The floors of all rooms are covered with linoleum. The walls and ceilings are of plaster, with concave angles, except at floors, the omission of which is, of course, complained of.

The patients' bedrooms are all on the first and second floors. The northern side of the ground floor of the west wing contains the matron's and nurses' rooms ; that of the east wing the consulting room, lavatory, doctors' bathroom and the patients' baths. On the south of these are corridors, and south of these again are the *liegehallen*, about three metres wide. These form a structural arcaded verandah beneath the patients' bedrooms. There is also a *liegehalle* seventy-eight metres long in the woods, fitted with eighty couches. The ventilation of the patients' block is by the window and by a central turret. The medical officer's rooms are on the north side of the central block, with a committee-room on the first floor.

At some distance east of the sanatorium is an administrative block connected by a subway. This block consists of basement and hree other stories. It contains the boiler and engine houses, disinfector, accumulator-room, laundry, stables for cows and horses, and residences for the remaining staff and female servants.

I conclude the description of German Sanatoria with that of the Nordrach colony in the Black Forest, nine miles from the little station of Biberach. To describe this colony one must picture the locality. The road from the railway ascends, and for some miles follows the river Hammerbach. The scenery is beautiful. On either side the hills covered with trees slope up from the river, sometimes gently, sometimes in bold escarpments. In the grey distance they rise to small mountainous heights dotted everywhere with trees, save for patches of greensward. In the midst the rapid river sparkling in the sun, which on the day of my visit also glistened on the snow-clad trees. Rising ultimately to a height of about 1,500 ft. above the sea, we passed through Nordrach, where a sanatorium of the hotel type has just been erected, and some half-mile or more beyond we come to Dr. Walthers' famous colony for consumptives. Here there is no sanatorium proper, but many small buildings dotted about the hill-side. We alight at one containing the office and kitchens, with a long dining-room for patients attached. A wooden structure, simple enough in character, with windows on both sides and a gravel terrace on one side. High up the hill to the left is the largest building of three stories, containing rooms for twenty patients. It consists of a long centre, with two short wings at obtuse angles of some 190 deg., so that they face to the S.S.E. and S.S.W. At the intersection of the angles are hexagonal turrets. There are two staircases. In this building, as in the others, each patient has a separate bedroom of about fifty cubic metres capacity. All have single casements with fanlights, which latter are hung at the top and open outwards. There are balconies to some of the rooms. The ventilation is by the windows and doors. Each bedroom is fitted with a douche bath, supplied with hot and cold water. There are only two slipper baths altogether, and these are solely used for medical purposes. There is only one water-closet for every ten patients, placed within the building. The floors are of wood, covered with linoleum. The walls and ceilings are of narrow boards, beaded not only at the edges, but on the solid parts, and there is a moulded wooden cornice. There are no concave angles. It is strange that all canons of smooth surfaces and rounded angles are here set at naught. The explanation probably is that there is no dust in the place. I have before noted that each bedroom is fitted with two lavatory basins, one for washing, one for sputum. There are no *liegehallen*. Dr. Walthers objects to them. He says, "You should not make patients lazy, but active." There are a few ordinary summer-houses in the grounds. Another building of two stories is provided for sixteen patients, and the rooms are only about 8 ft. high. It is not only electrically lighted, but heated by electric radiators of the doctor's own manufacture. The medical staff consists of Dr. Walthers and another physician of equal standing, as the doctor was careful to tell me. There is a secretary. There are no nurses as such, the doctor holding that nursing, as we know it, "ought to be done by the medical men." There are two female servants to every ten bedrooms. In parentheses it may be interesting to know that Dr. Walthers strongly objects to the plenum system of ventilation, about which we lately heard a good deal, of which he has had experience.

There are various other buildings forming the colony dotted about here and there. Among them is the doctor's house, with the sitting-room made so that in the summer the external wall or enclosure can be completely removed. It will be seen from the foregoing that Nordrach has nothing of the structural sanatorium about it. It is a hamlet on a mountain side, "far from the madding crowd." Nature provides varied refreshment for the body and mind. For the rest, it is a little world where patients place themselves under a medical man of strong, masterful personality, who orders their being generally. To live in such a position a life of simplicity under hygienic rules, to have no cares, and to be interested is to be, as nearly as our mortal frame will permit, free of disease. We have, however, to deal not with an ideal place and life, but with the workaday world. For ordinary mortals, and specially for those of our poorer brethren, we must bring to their aid everything that sanitary know-

ledge of building can give. Before leaving this part of my subject I wish to express my indebtedness to the following medical gentlemen, who extended to me the most courteous hospitality and gave me in the readiest way every information and assistance in my investigations :—Dr. Hess of Falkenstein, Dr. Curschemann of Ruppertshain, Dr. Bauer of Nürnberg Engelthal, Dr. Hermann of Harlaching, Dr. O. Pischinger of Krailing, and Dr. Walthers of Nordrach.

It may now be of interest to briefly describe one or two modern English institutions. I have had the pleasure of visiting the sanatorium near Crookesbury Ridges under the direction of Dr. J. Rufenacht Walters. Dr. Walters is too well known as the author of an admirable book on sanatoria to need any other introduction here. His sanatorium is a small one, for twelve patients, but I am glad to learn it is about to be doubled. The sanatorium consists of twelve single bedrooms on one floor, all with French casement windows facing south and opening on to a verandah, canvas covered, for reclining couches. A corridor runs the whole length behind. There is one nurse, and she lives in the building. The cubic capacity of the rooms per patient is about 1,100 feet. The floors are of wood covered with linoleum. The walls and ceilings are of plaster, with slightly concave angles, except to floor—a regretted omission. The ventilation is by the windows, by inlet tubes, and by shafts at ceiling level across the corridor to the north. In the new block there will be fanlights to the doors, so that all the room may be scoured with air. There is a room with one slipper bath and one earth closet, both opening from the corridor. In the new block these will have disconnecting lobbies. The dining-room is attached, and also opens from the corridor, and beyond it are the kitchen and offices. The heat is by hot water radiators. The lighting is by electricity.

It might be here opportune to consider the question of the best position for *liegehallen* or reclining verandahs. There is some difference of English medical opinion on the subject. It is held by some, and it seems to be a sound doctrine, that if patients are so delicate that they must lie down the greater part of the day, they should be as near to the medical man and to their own bedrooms as possible, so as to save the strain of even a short walk. In three of the five typical German buildings described, the *liegehallen* form verandahs to the actual buildings, and the convenience of these is approved by the medical chiefs of all, the only complaints being in regard to excessive width and solidity of building. In one of the others there are reasons of planning why this cannot be done. At Crookesbury Ridges the same verandah scheme is adopted and approved, and is to be repeated in the new block. In the perspective view shown by me as a design for a sanatorium, I have adopted this arrangement with a balcony over for half the building, and it will be seen the width and construction is such that the German objections do not apply. Dr. Hermann thought this arrangement very satisfactory.

A larger institution is that called Pinewood, at Wokingham, designed by Mr. F. Jones, who has kindly lent me a plan. This has accommodation for sixty-four patients, each in a single bedroom of an average cubic capacity of 1,100 ft. The institution consists of a central block of three stories, containing the consulting-rooms, offices, and dispensary, with residences for the medical staff above. Detached from this on either hand is a patients' block of two stories, containing thirty-two single bedrooms. These blocks face S.S.E. and S.S.W., and each has a corridor on the inner or northern side. There is one staircase. The ground floor walls are of brick ; the first floor is enclosed by wood framing covered with boards and tiles. There is one resident nurse in each block. The douche and slipper bathrooms and water-closets are on the north side of the corridor, and open directly from it. The windows are single casements which do not reach the ceiling. The doors have no fanlights. The floors are boarded and covered with linoleum. Walls and ceilings are of plaster. There are concave angles, except to floors, where angle fillets are fixed. The heating of rooms is by open fires, that of corridors by hot water radiators. Ventilation is by windows and doors. Lighting is by electricity. The administrative block is detached to the north, it contains a handsome dining-room, with service and nurses' rooms attached. Kitchen and offices, with female staff bedrooms over, and other rooms adjacent. There is a laundry block with disinfector, an engine-house, stables, &c.

I may now perhaps describe a sanatorium which the Brompton Consumption Hospital is about to erect at Frimley, in Surrey, from my designs. It is to accommodate one hundred patients, and, unlike the others, it is for non-paying inmates. There are fifty-two single bedrooms, twelve with two beds and eight with three beds. Every patients' room will face S., S.S.E., or S.S.W. Outside the central block is a wide paved terrace. It will be noted that, unlike the German Sanatoria, we have provided a large number of single bedrooms. By some it is held that for the poor, rooms with more than one bed are best, as patients like company. On the other hand, others—among them Dr. F. R. Walters—hold that it is better for the patient's recovery, be he rich or poor, to have a bedroom to himself. It must be remembered we contemplate that only first stage cases (with exceptions) will be admitted, and every inducement should be given to make patients get out into the open air as much as possible, the bedroom only being used at night. Of course, there are cases where it may be desirable for two or three to be together, as where bleeding is likely to occur, when one can help the other. We have therefore effected a compromise, fixing our maximum at three beds. Many of the German doctors with whom I have discussed the question favour this as the maximum when it can be adopted.

The sanatorium proper, or patients' block, is two stories in height, and consists of a central block with four radial wings or pavilions, all built of brick, the upper story tile hung on the brick. By this arrangement any one floor of the two sides of the four wings may be appropriated to women, leaving the others for men ; and each group is self-contained, with its separate sanitary conveniences. It also affords much greater facilities for classification than could be found in one building of the ordinary type. The main entrance hall is in the centre, and behind it is a day room facing south, with two three-bed wards at the sides. East and west of the hall are the consulting and matron's rooms, dispensary, and sister's duty-room. The first floor has similar patients' and sisters' accommodation, a residence for the matron, and a bedroom for the housekeeper. Overhead, in the roof, are bedrooms, &c., for female servants. The pavilions are connected to the centre by enclosed corridors having windows on both sides. Each wing contains twenty-two beds. The corridor on the north side has no obstruction whatever to light and air. Opposite every room door there will be a window in the corridor, and as all doors will have fanlights carried, like the windows, to the ceiling, we shall get thorough ventilation, and even on hot sultry days the cooler air on the north side of the building will induce a current to the hotter south side. The windows will be casements, those on the ground floor open to the floor, so that, if necessary, beds may be wheeled out. The casements are so constructed as to keep out rats and other vermin while the windows may remain wide open. On the first floor there will be outside jalousie shutters, which can be closed either to exclude rain or intense sun heat, the windows remaining open. On the ground floor, rolling canvas blinds, like those over shops, will effect not only the same purpose, but will shelter beds or couches outside. By this means we get the advantages of a verandah. On each floor are two large linen rooms, and on the ground floor are boot-cleaning rooms.

Between each pair of pavilions is a sanitary tower, detached except for a cross-ventilated lobby. This contains all the patients' water-closets, baths, lavatories, and housemaids' closets. I have provided no urinals in the building. They are filthy things at best, and with lifting closet seats are unnecessary. For the nursing staff on duty, separate lavatories and water-closets are provided on both floors. There are two main staircases, and at the outer end of each pavilion a fire-escape staircase. The heating generally will be by hot water, throughout the lighting by electricity. The floors will be of wood covered with linoleum, and all walls and ceilings will be of plaster with concave angles everywhere. To the north of the sanitorium proper, and reached by a glass-covered way for wet weather, are the two patients' dining-rooms and a general assembly hall. Behind are the kitchen block, female servants' hall and men's room, &c. At the east end is the nurses' home, to the west the medical officers' residence. Nearer the main road will be the laundry, boiler, and electrical engine houses, ambulance, mortuary, and gate lodge. There are two laboratories. The plans have received the most careful consideration of the medical staff, and I have particularly to express my indebtedness to Drs. Theodore Williams and Fowler, who, with the sub-committee, have gone minutely into every detail of the scheme.

In conclusion, may I be permitted to refer to the new Camberwell Infirmary in course of erection from my designs. There will be 800 beds in the institution. My reason for mentioning it here is, that the Board of Guardians have on the advice of the Medical Superintendents, Dr. Keats and myself, made special provision for treating tubercular patients. We have three large wards of twenty-four beds each, in which practically the whole length of the walls or enclosures on three sides are made to open, so that the patients may be said to lie in the open air, and above the wards are flat roofs with easy access, so that the patients can be actually in the open air all day long.

As far as I am aware, this is the first Poor Law institution in the kingdom where this has been done, and we hope it may be the means of bringing open-air treatment to the poor at their own doors in a practical way.

THE NEW PUBLIC OFFICES IN PARLIAMENT-STREET.

The following letters on the above subject appeared in the *Times* of Saturday and Monday last :—

" To the Editor of the *Times*.

Sir,—I fear that there is grave danger that the public offices about to be erected in Parliament-street will be spoilt by the action which the Government propose to take.

It will be within the recollection of your readers that the architect, Mr. J. M. Brydon, who had been selected for the work, unfortunately died before his drawings were completed. It now appears that, from motives of false economy, the Government intend to entrust the completion of the designs to the Office of Works instead of following the precedent which was set on the death of Mr. G. E. Street before the completion of the Law Courts, when Sir Arthur Blomfield was appointed to superintend the completion of the building. It is true that the First Commissioner of Works proposes to add Mr. Brydon's chief assistant to his staff for this purpose, and I have not a word to say against this gentleman, nor against the permanent staff, who no doubt are thoroughly competent for their own special work ; but that work is not the erection of vast buildings of national importance.

The character of Mr. Brydon's design is such that its effect when completed will depend, far more than it is easy for the public to realise, upon the proportions of the cornices and mouldings, and the design of windows, doorways, and innumerable other minor parts of the building. Mr. Brydon was unable to complete the drawings for these details, and if, therefore, this important mass of buildings is to be carried out in a manner creditable to the country it is of the utmost importance that an architect of the first ability should be appointed to complete the designs of one who had been selected with much care from among the foremost members of his profession.—I am, Sir, yours faithfully,

ARTHUR W. SOAMES.

House of Commons, July 30.

Sir,—I think that some one who is not an architect should support Mr. Soames's appeal to the Government to appoint an architect of distinction to finish Mr. Brydon's incomplete drawings of the details of the new public offices. My excuse for joining in his appeal and for writing this letter is that I was a member of the Select Committee of the House of Commons that inquired into and reported in 1897 upon the sites for the proposed new Government offices. In the general proposals which they laid before that Committee the Government showed an unusual liberality and a large appreciation of the importance of adding to the dignity and beauty of Central London. And Mr. Akers-Douglas, as Chairman of that Committee, and since then in his conduct as Chief Commissioner of Works, has displayed deep interest in the successful execution of this great scheme, and a constant desire to consult the best architectural opinion.

It is the more remarkable, therefore, that the Government and he should now hesitate to take a step which common sense would seem to dictate. It is possible, no doubt, that satisfactory effect may be given to Mr. Brydon's designs by the officials of the Office of Works, assisted by Mr. Brydon's chief draughtsman. But who is there outside the walls of that office who is not convinced that it is in-

finitely more likely that these details will be satisfactorily and artistically worked out if their execution be entrusted to some architect of note?—Yours faithfully, C. A. WHITMORE.

75, Cadogan-place, S.W., August 3.

SIR,—May I support the plea put forward by Mr. Soames that further steps should be taken by the Office of Works to complete the new public buildings in harmony with the intentions of the late Mr. Brydon? There is no financial difficulty, as ample provision was made by the Treasury for the architect's fees; 26,000*l.* was allotted for the Westminster buildings, and I understand that of this amount not much more than 10,000*l.* was spent during Mr. Brydon's lifetime. A very large balance, therefore, remains, and, while we all applaud the wisdom of Mr. Akers-Douglas in appointing Mr. Brydon's chief assistant to continue as draughtsman, I feel strongly that the money ought not to be intercepted by the Treasury.

The site is one of the finest in London, and it would be deplorable if we save a few thousand pounds and thereby imperil the dignity and refinement of our new Government buildings.—I have the honour to be your faithful servant,

74, Brook-street, August 3. BALCARRES."

MAGAZINES AND REVIEWS.

The *Magazine of Art* contains an article giving, under the title of "The Home of the Royal Cambrian Academy," an account and illustrations of the fine old house called Plas Mawr, at Conway, built in the sixteenth century by Robert Wynne, and now the premises of the Cambrian Academy of Arts. The writing and illustrations—the latter very good—are both by Mr. E. W. Haslehurst. Stephan Sinding, a Danish sculptor whose work is the subject of an article, appears to be one of the modern school of mystics in sculpture; his "Terra Mater" and "Man and Woman" suggest the influence of Rodin. An illustration is also given of a remarkable Kashmir shawl (modern work) worked with a plan of the city of Sringar. The execution is said to be so fine as to give at first sight the impression of stamped work.

The *Art Journal* describes Taormina under the title "A Suburb of the Sun," the illustrations being by Mr. C. Kingwood, and Mr. Arthur Tomson illustrates Dorchester with pen and pencil; and yet again there is another descriptive and illustrative article of the same kind, on Rothenburg, by Mr. James Douglas. There is a fine illustration of M. Debat-Ponsan's charming picture, "En Plein Air," as a frontispiece to the number.

In the *Studio* we come again on the Topographical article; Tréport being the subject. "Something too much of this." Mr. Alexander Fisher's article on "The Art of Enamelling" (continued from last issue) is really valuable, for it gives practical instruction in the technique of this fascinating branch of art.

In the *Artist* Mrs. Chance's paper on old and new furniture and on furnishing is very good in many of its remarks, especially as to the bad influence of fashion in turning out good designs and bringing in bad ones, but some of the illustrations, which we presume are supposed to be what we ought to like, are both poor and clumsy, and really not better than some of the despised trade furniture, only they are less hackneyed. Simplicity in furniture design need not descend into awkwardness and want of style.

The *Architectural Record* (New York) contains an article by Mr. Frank Fowler on "Mural painting and a word to architects." Mural painting appears to be receiving great attention in the United States, and Mr. Fowler's object in writing is partly to urge that the artist should be given his best chance by being entrusted with the colour-scheme and the decoration of a whole apartment. He instances (and justly) the serious mistake made in the Panthéon at Paris, by parcelling out the interior among a number of painters of totally different styles. As he says, if Puvis de Chavannes had only had the whole, we might have seen a great work in decorative painting, such as would have enhanced instead of destroying the architectural unity of the interior. To the same number Mr. Caryl Coleman contributes an article on the rather new subject of "Episcopal Thrones and Pulpits." An article on "New York Apartment Houses" by Mr. C. H. Israels, with a number of plans, may interest the builders of London apartment houses, though they may not think they have anything to learn from it, New-York requirements in the way of plan and arrangement differing considerably from ours. The article on the "New York Stock Exchange," in its present edition a piece of academical classic architecture designed by Mr. Post, is of value on account of the plans and the detailed description of the construction and arrangement.

The *Architectural Review* (Boston) in No. 6 of its eighth volume, gives a number of interesting designs of memorial gateways erected at Harvard University; all, apparently, designed by Messrs. McKim, Mead, & White. A gateway is a very suitable form of memorial erection. and the examples given here, though they are all rather simple and unpretending in form for memorial gateways, are in the best possible taste, and show at the same time a great deal of variety. Besides those given in the plates, there are several other examples in the text, accompanying an article on the subject by Mr. W. D. Swan. The number includes another article, with some small illustrations, on "Recent Buildings at Harvard University," by various architects. They all seem to affect a very quiet and decidedly English style. This may be called a Harvard number of the *Review*.

The illustrations in the Berlin *Architekturwelt* show a curious collection of examples o the eccentric cleverness of modern German architectural and decorative design. There are views of a restaurant by Herr Reimann, which, except on the entrance or business-front, looks rather like a country château There is a charitable institution in brick, with semi-Gothic details of a rather wiry character (Herr Diestel). Then we come on an effectively treated apartment house by MM. Schilling and Wiehe, a very nice piece of street architecture; followed by a large country house that looks like a church. Then we come to what are, let us hope, the examples of imaginary architecture only, for anything more rampant in its eccentricity than the "Landhaus" from the Berlin art exhibition of the year it would be difficult to find; it is a kind of nightmare. Messrs. Schulz & Schlicting's Casino (also an exhibition drawing) is something more reasonable; and Herr Reuters's competition design for the Dresden Rathhaus is a more sober and indeed somewhat heavy architectural conception; the same architect's sketch for a church is an almost lunatic design; on the other hand his sketch for a "Bismarck-Thurm" is rather fine, though the finish at the top is very ugly. Herr Reuters represents one type of German architectural design of to-day, in which the object seems to be to reduce everything to masses of wall and round stumpy columnar effects; it looks like an utterly unpractical school of architecture, suitable only for monumental towers and the like. The new school of furniture has its turn in the illustrations, and there are some examples of ceiling design of various degrees of eccentricity; that by Professor Seliger, with a figure with the feet pointing to each angle, and a symbolical representation of the sun and the starry heaven, is rather fine. Whatever may be said about the uncertainty of aim among English architects of to-day, we seem really to be very sober and collected in our aspirations in comparison with the Germans, if we may take the medley of this present periodical as typical.

The *Edinburgh Review* contains an article on the at present specially interesting subject of "Temporary Stars," for the appearance and disappearance of which no definite explanation is brought forward, though various suggestions are made; but the article is an able one by a competent hand. Another article which we may mention in the same number is that on "The Spectacular Element in Drama," in the main a defence of spectacular effect, which the writer thinks supplies the relief, for the less educated portion of the audience, which Shakespeare, in the absence of this resource, was fain to supply by the introduction of "comic business." It is rather curious to note that in following out this line of argument the writer of the article comes round (though without appearing conscious of the coincidence) to Voltaire's condemnation of the vulgarities of the porter in "Macbeth," as being quite out of keeping with the general spirit of the play.

In the *Quarterly* a paper on "The Dawn of Greece" reviews the recent discoveries in Early Grecian archæology, especially in Crete.

The *Monthly Review* contains a long article by "Julia Cartwright" (Mrs. Ady) on the Castello of Milan, which has been in process of repair and restoration (we hope not of too drastic a character) during the last eight years, under the direction of two architects, Signor Beltrami and Signor Gaetano Moretti. A plan of the castle is given (it is something rather new in England to find a literary review condescending to give plans of buildings), and a sketch of its history, together with photographs of paintings in which some of the former owners of the castle are introduced, or which are connected with its history.

In *Blackwood* the writer of the generally witty and thoughtful "Musings without Method" has a good deal to say, with which we are entirely in agreement, in regard to the neglect of old buildings of interest, and the indifference with which people in this country will allow an interesting old building to be pulled down, or a fine view to be spoiled by buildings of no charm. He speaks well and eloquently in regard to the subject of Hogarth's house, and of the view from Richmond Hill. But he falls into the common and vulgar error of attributing these vandalisms to architects, who are in fact the strongest opponents of them. He must needs indulge in the usual easy sneer at the English architecture of the day. "The architecture of modern England is oddly suited. It buys its windows in Italy, its round towers in France, its tiles in Lambeth, and its decorations everywhere." This is of course a parody of a well-known speech in Shakespeare—Portia's description of one of her suitors; but there is no point in it. Where are the round towers that are "bought" from France, or the windows from Italy? The prevalent tendency of English architecture lately has been to become decidedly English—to take the detail of our own classical buildings as a model. The sentence is therefore nonsense, and suggests that the writer has paid no attention to recent architecture. What follows is still more absurd, and in fact worse than absurd: "moreover, our architects have too often shown so keen a desire for a job that they have condemned as unsafe walls which, having stood the storms of centuries, were prepared to endure the centuries yet unborn." That is an utterly unpardonable libel on architects. who, as a fact, are almost always on the side of conservatism in dealing with old buildings; and in cases where an architect does condemn walls as unsafe, is it not possible that he is a much better practical judge of the matter than a literary man? It is not creditable to a magazine of the standing of *Blackwood* to publish such nonsense; but on these subjects, unfortunately, the editors of literary magazines are as ill-informed as their contributors.

In *Scribner* Mr. Frank Fowler, under the heading of "The Field of Art," asks what is the best heritage of the art of painting from the nineteenth century. In an American magazine we know the answer before we read. It is the latest school of France which is the heritage; beginning with Troyon and Rousseau and ending with Millet and Monet. We are shown that the revolt of Delacroix and Géricault against the Academic School was only half a revolt; that they still retained a convention of their own, and did not come into close enough contact with nature. That is true; Delacroix was thought a dangerous radical in his own day; we now see that he was nothing of the kind. We can also see—what Mr. Fowler apparently does not see—that Troyon and Rousseau were no more "natural" artists than Delacroix. They translated nature into an art of their own, they did not imitate her. It is now asserted that the latest school of all—Monet and the other impressionists, are the people who have led us into the true path in painting. So it seems to many people now; but how will it seem fifty years hence? Will there not be critics then who will find out that the Impressionists had not got hold of the real thing, just as Mr. Fowler can now see that in the case of Delacroix? In the same number is an interesting topographical article on "Rural New York"—the picturesque and rural element on the outskirts of New York, with illustrations showing what very primitive and very English-looking cottages and farms are to be found around the outskirts of New York.

In the *Century* Mr. Cole's "English Masters" series of engravings is represented this month by a very good translation of Turner's well-known work "A Frosty Morning," one of the finest of the works of his middle period. The frontispiece forms No. 6 of "Examples of American Portraiture," a portrait of a lady by

Mrs. Adelaide Cole Chase, an artist who is a native of Boston, and has studied under MM. Jean Paul Laurens and Carolus Duran. The portrait is one with a good deal of original character. "Venice Gardens" is what may be called an ornamental article on this charming subject, by Mr. Lee Bacon, and is decorated with a profusion of ornamental borders and sketches by Mr. H. McCarter. An article on "Photographing by the Light of Venus," by Mr. W. R. Brooks, gives some surprising examples of photographs obtained, on a highly sensitive plate, from the light of Venus, without the interposition of any lens or magnifier. "What a Train-despatcher Does" may be of interest in giving us an insight into American railway working; we have nothing to learn from them in that way. It is amusing to read some of the specimens of telegrams—"Engine 309 leaking, and could not handle full train from Piedmont," &c. That is what comes of the American system of building locomotives cheaply to last only ten years, till the next new model comes up.

In *Harper* "The Birth and Death of the Moon," by Dr. E. S. Holden, is an admirable popular *resumé* of what astronomical science can tell us in regard to the past and probable future history of the moon and its mechanical relation to the earth.

The *Pall Mall Magazine*, under the title "Napoleon at Play," gives the history and some illustrations of his Consular house at Malmaison, now (through the munificence of M. Osiris) preserved as a Napoleonic museum. "Over a hundred miles an hour—the story of the Monorail," by Mr. Wayland Smith, jun., is a paper on the subject of the projected monorail line from Liverpool to Manchester, with illustrations of the railroad and carriages. The writer sees everything *couleur de rose* in regard to his favourite system of railway, and we can by no means accept all his conclusions, which still want the practical test of experience, but the subject is likely to be of increasing interest. In support of the argument that high speeds are safer and more practicable on a monorail than on the ordinary double track, Mr. Smith cites, what certainly seems to be to the purpose, the superior flexibility and safety of the bicycle in turning corners at speed, as compared with the tricycle. But then the bicycle rider brings his bodily balance into play, leaning over to the inner side of the curve as he turns, to neutralise the centrifugal force. Is any similar action contemplated or possible with the monorail electric railway?

The *Westminster Review* contains an article by Mr. E. H. Selby Lowndes on "The Rural Exodus," an endeavour to arrive at the causes of the continual migration from rural districts to London and other large towns. Mr. Lowndes has a new theory to account for this, which may be correct. He thinks the causes are to be found in the dulness of country life and in the awakened ambition of the present better educated race of labourers, rather than in any housing or labour problem. An agricultural labourer who has had a temporary town berth and returns to his native fields, does so in a spirit of superiority of which he makes no secret. He has seen life, and his rural compeers are ambitious to see it also. There may be a good deal of truth in this. If so, what is the remedy? Perhaps the solution is suggested in the epilogue to Tennyson's "Princess." Let the influential and wealthy country gentlemen exert themselves to put more life and interest into their neighbourhoods.

In the quarterly *Journal of the Sanitary Institute*, the only important sessional paper is that by Drs. Kenwood and Butler on "Sewage Purification and Standards of Purity." The authors believe that the biological method of sewage purification is not only the most rational, but also the most effective, and that what may be termed percolating filters are much more effective than filters which are allowed to stand full for a time. They are also in favour of preliminary tank-treatment, although rather for the purpose of simple sedimentation than for any gain in purification effected by anaërobic bacteria. In the discussion Dr. Rideal insisted on the necessity of anaërobic treatment for the purpose of hydrolising fat, celluloid, straw, vegetable fibres, &c. The authors' contention that the ordinary standards of chemical analysis are quite untrustworthy as an index of the character of an effluent appeared to meet with general approval, as did also their definition of a good effluent as one that will "not undergo offensive decomposition under any circumstances to which it is likely to be subjected before finally reaching the sea." In a contributed article, Mr. Douglas Archibald draws attention to some of the defects of the biological treatment of sewage, particularly the small degree of purification effected, and suggests that chemical precipitation in tanks followed by filtration, will give much better results at little or no extra cost.

Feilden's Magazine contains an important article by Mr. Milton P. Higgins, on the possibility of getting a higher standard of general education among machinists, by a system of half-time school and half-time working extending over four years. The moral is of course that we can get the best work from the best educated machinists, those who combine intellectual education with familiarity with practical work. Among the other contents of the number are an article on "Modern Ice-making and Refrigerating Plants," and one, the first of a series, on "How Great Britain is Meeting Foreign Competition," this article dealing with the subject of electric traction. In the course of the article it is mentioned that some American managers computed that they could get as much work from English workmen in a fifty-hours' week as from American workmen in a sixty-hours' week. This is not what we generally hear, and is so far satisfactory. The writer considers that it is from the want of capital and enterprise rather than from any deficiency in the manual labour that England is losing her foreign trade.

In the *Engineering Magazine* is an article on "The American Locomotive as a High-speed Machine," in which the writer makes the damaging admission (which we are not in the least surprised at) that the nature of a large proportion of the railroads in America renders high speeds impossible, even with the best constructed engines. "There is no object in building higher-powered locomotives to drag trains up steep hills, and round short curves, or upon gradients more or less heavy, by brute force. There it is merely burning the candle at both ends, for it increases the expense of maintenance without improving the service." The criticism, it will be observed, is purely from the commercial point of view; the question of the safety of the passengers does not come in. A long article on "Great Electric Installations of Italy," by Signor Bignami, will probably be of interest to English electrical engineers.

In the *Essex Review* (quarterly) an article on "The Dykes of the Thames" gives a *résumé* of a subject of both practical and picturesque interest, about which even Londoners, who live so near the lower Thames, for the most part know very little. It is interesting to find that some of the first dykes made to keep the Thames water within bounds were constructed by Dutchmen, brought over here in consequence of their national familiarity with the problem.

The *Church Builder* (quarterly) contains No. 8 of Mr. Micklethwaite's series of "Occasional Notes on Church Furniture," in which he is sarcastic (and not without reason) on the mischief done by "the practical man" who undertakes to carry out small repairs in the church from time to time without troubling the authorities to call in the architect.

We have received also the *Révue Générale*, the *Gentleman's Magazine*, and *Knowledge*.

COMPETITIONS.

MALLOCK MEMORIAL, TORQUAY.—The result of this competition has now been published. The successful competitor is Mr. Donkin, F.R.I.B.A., of Bournemouth. The number of designs submitted was 79. Mr. Hine, architect, of Plymouth, assessed the designs on behalf of the Committee, and his recommendation of Mr. Donkin's design was accepted by the Committee.

NEW BRIDGE, WHITCHURCH. — The wooden bridge that crosses the Thames between Whitchurch and Pangbourne is to be replaced with one constructed of steel, and with abutments of brick and screw piles; the new bridge, having a total length of 270 ft. in four arches, has been designed by, we understand, Messrs. Joseph Morris & Son, of Reading.

THEATRE, LOWESTOFT.—Lowestoft Theatre in the Marina has been rebuilt and renovated. The plans were prepared by Messrs. Ernest Runtz & Co., of London. The building contract has been carried out by Mr. George Elsey, of Kirkley. The building has cost between 6,000*l.* and 7,000*l.*, and will seat 1,300 persons.

Illustrations.

COMPETITION DESIGN, HEREFORD MUNICIPAL OFFICES.

THIS design was submitted in the recent unsatisfactory competition reviewed in the *Builder* of July 20, the illustrations showing an attempt to provide the accommodation required in a convenient, workable, and architectural manner.

The street façade was to be executed in Portland stone, and the roof covered with stone slates.

The authors, Messrs. Bateman & Bateman and Mr. Alfred Hale, of Birmingham, submitted the drawings under the device of a figure 1 within a green wreath.

We give the perspective view, section, and two plans.

NEW COLLEGE, SCARBOROUGH.

WE give the perspective view and two plans of this building, the architects of which are Messrs. Hall, Cooper, & Davis, of London and Scarborough, whose design was selected in a competition.

The building is to be constructed of local material faced with local red pressed bricks and stone dressings, the roofs being covered with red Ruabon tiles. The main entrance has a southern aspect, and the main road to the college is planned from Filey-road. Care has been taken to arrange the block so as to sever the master's house from the school and dormitories, and yet make the whole one building, the connecting link between the two being the kitchen. The arrangement of rooms on the south of the building comprises the main entrance, with inquiry office and entrance hall. To the east of this is the master's common-room and boarders' recreation and reading room, which is 29 ft. by 17 ft., and is fitted up with bookshelves and specially arranged so that the pupils may have its advantages for night study in lieu of the schoolroom. To the west of the entrance is the secretary's office and boardroom (the latter being adaptable to other requirements), and master's study, which is carefully arranged in order that the master may have access to the school apart from his residence. The dining-hall is to the north of the principal staircase on the first floor, and is capable of dining 100 scholars, the tables being arranged so that all the boys face the centre table. The plans show the room to have two spacious bay windows overlooking the sea. To the west of the dining hall is the servants' room, and adjoining is the kitchen and scullery. The servants' hall, china closet, &c., adjoin the kitchen. The master's house is at the south-west angle of the building, having a separate entrance, with convenient dining-room and drawing-room overlooking the south front, and adjoining the study.

The schoolroom is entered from the main entrance corridor, which corridor runs the whole block of school buildings, and could be extended with any future extension of classrooms. The schoolroom is 52 ft. by 24 ft., and is capable of assembling 200 boys. It is to be heated with hot-water radiators, and the plans show two large open fireplaces at each end in addition. To the west and south are arranged three classrooms, properly lighted, fitted with dual desks, heated with radiators and open fires, and arranged to accommodate ninety-six boys, in addition to which classes could be taught in the schoolroom and lecture-hall. To the north and east of the schoolroom is arranged the day scholars' entrance with vestibule porch. The chemical laboratory is planned to accommodate twelve boys at practical work at the same time, and is to be fitted with the latest chemical arrangements, working tables, &c., in accordance with the regulations of the Science and Art Department. The lecture-hall is to be fitted with desks, seats, and a demonstration table. To the west of the school arrangements are made for lavatories, clothes drying-room, and boarders' locker-room, fitted with a separate locker for each boarder, and provided with a lobby entrance from the grounds, by which the boys can reach their lockers and drying-room after football and other sports without using the main entrance. The first floor is reached right and left of the main staircase, and a spacious landing is planned with head assistant master's room overlooking it, to the right of which are the dormitories. Two dormitories

have seventeen beds each, and one dormitory nine. Each dormitory is overlooked by an assistant master from his bedroom. In the master's house there are five bedrooms, bathroom, &c., and the servants' bedrooms are immediately over the master's house, and completely cut off from the other part of the building. On the third floor is the nurses' bedroom, sick day-ward, and a sick night-ward, specially isolating any sickness from the other rooms. Here also is an extensive boxroom, fitted with box racks, and connected with a lift direct from the main hall. Five servants' bedrooms are shown, but the architects state that these can be extended when required. The whole building is to be warmed by open fires and steam radiators under low pressure. The ventilation will be by means of automatic or natural ventilation.

The contractors for the work are:—For bricklayers', masons', and plasterers' work, Messrs. Overton & Son; for carpenters' and joiners' work, Mr. Geo. Scales; for plumbers' and glaziers' work, Mr. G. F. Wells; ironfounder and smith, Messrs. Appleby & Brogden; tilers' work, Mr. Joseph Hargraves; painting, Mr. Thos. Fidler. Mr. R. Dove was clerk of works.

Mr. H. C. Fehr has modelled a symbolical sundial with figures over the main entrance on the south front.

The school furniture and chemical laboratory and lecture theatre fittings are by Messrs. C White & Co., London.

PROPOSED COUNTRY HOUSE, NORTH DEVON.

THIS is a design for a small house made by Messrs. Baillie Scott & Seton Morris, who however we believe are no longer in partnership.

The plan shows more attention to the differing requirements of aspect in dining-room and drawing-room than we sometimes find in small house plans. The drawing-room has its chief window west; the dining-room (which in so small a house would also be the breakfast-room) has its chief window east, but a small bay, out of the main line of lighting, gives the opportunity for a south outlook when desired. The kitchen is, we presume, top-lighted.

ADDITIONS, ROWLEDGE, NEAR FARNHAM.

THIS illustration is from a coloured drawing by Mr. John Fulleylove, R.I. It represents additions made to a small cottage having a large garden. The materials were local red brick and Portland stone. The work was carried out by Messrs. Thompsett & Kingham, of Farnham, from the designs of Mr. Thomas Batterbury, architect, of London.

ARCHITECTURAL SOCIETIES.

ULSTER SOCIETY OF ARCHITECTS.—A special general meeting of the members of this Society was held in the rooms of the Society, 16, High-street, Belfast, on the 22nd ult. The chair was taken by Sir Thomas Drew, R.H.A. (President). The minutes of last meeting having been read by the honorary Secretary (Mr. N. Fitzsimons) were confirmed. Messrs. Craig, Jackson, and Tulloch were appointed to open ballot-papers for new members, and having handed in their report, the chairman declared the following to be duly elected, viz.:—As Member—Mr. W. J. W. Roome. As Associates—Messrs. R. Donnelly and J. V. Johnston. As students—Messrs. W. A. Douglas, E. R. Kennedy, and J. M. M'Glade.—Sir Thomas Drew, in an address, congratulated the members on the rapid progress made by the Society since its formation, and expressed the hope that in a short time all the respectable architects of Ulster would be members and would be working together as harmoniously as the architects of Dublin and other large cities in the kingdom. — The Vice-President (Mr. W. J. Gilliland) made a statement on behalf of the Council as to the business transacted since the general meeting, held on May 28, and as to the prospects of the Society generally. He mentioned that seven meetings of the Council had been held, and, in addition, meetings of sub-committees for special purposes. Two representatives had been appointed to represent the Society on the council of the Royal Institute of the Architects of Ireland, and the Royal Institute of British Architects had been officially informed of the inauguration of the Society, and had entered into official communication with it. The first appointment of architects, since the formation of the Society, for work of a public nature in the district—that of Messrs. Græme-Watt & Tulloch, for the new asylum buildings at Purdysburn for the Belfast Corporation—was considered, and the details of the terms, which were placed before the Society at the request of the Council, were discussed, and were reported as unsatisfactory. A resolution had been forwarded to the Town Clerk on June 12 complaining of this unsatisfactoriness. The points objected to were that no travelling expenses were intended to be paid, that the remuneration was under that recognised in the profession, and that there were various other conditions as regards approval of plans and arbitrary rejection of same on account of disapproval by the Asylum Committee, or, in case they exceed the architect's approximate estimate by more than 10 per cent., without his having the opportunity to recast them to bring the proposed buildings within the permitted cost limit. The opinion was expressed that when the Asylum Committee understood that the proposed conditions were unfair and unreasonable, the majority, at least, who only wished to be equally fair to the ratepayers and to those whom they employed, would at once make the modifications which were suggested, as, of course, it was entirely against the interests of the ratepaying community that any services, especially those requiring great care and skill—the absence of which in architectural work was so disastrous in result—should be inadequately remunerated. —A communication had been received from the Belfast Master Builders' Association in reference to the framing of a common form of conditions of contract, and as to other matters which they thought it would be to the mutual benefit of architects and contractors to discuss, and, if possible, settle. It was reported that sub-committees had been appointed by the Council of the Society and the Master Builders' Association to have a conference with this object, and also that communications should be opened with the Royal Institute of Architects of Ireland, so that these matters should be settled to apply all over the country, instead of merely locally. The technical instruction of architectural students had also been considered, and application had been made to the Technical Instruction Committee of the Corporation for representation on the No. 1 Consultative Committee of the Technical Institute, and the Corporation had agreed to co-opt two members out of four names to be submitted by the Society. It was felt that those members elected on the Consultative Committee would be of service in advising as to the art instruction of architectural students, and that the experience gained on the committee would enable the Society to decide at a later date the question of the advisability of the promotion of classes in the new Technical Institute specially for architectural students. A recent competition, which was unsatisfactory in its results, was referred to, and the hope was expressed that now when a professional Society was in existence to watch over the interests of its members, such would not occur again. The attention of the members was called to two resolutions of the Royal Institute of British Architects, passed on March 5, 1900, which read as follows:—1. "That it is not derogatory to the profession for an architect to sign his buildings in an unostentatious manner, similar to that adopted by painters and sculptors." 2. "That it is undesirable for architects to place their names on boards or hoardings in front of buildings during course of construction for purposes of self-advertisement." It was reported that the prospects of the success of the Society were of the most encouraging character, and it was expected that within a very short time the membership would include every respectable architect resident within the district. The members were urged to support the exertions of the Council by utilising their services in every possible way, especially by calling their attention to any matter of professional interest which came under the notice of any member. It was hoped by the individual endeavour of each member to support the objects of the Society as set out in its constitution, that the larger proportion, if not all, of the disadvantages and grievances under which in the past the profession in the district had laboured would be ultimately removed.—On the motion of Mr. M'Donnell, the action of the Council in renting and furnishing rooms was confirmed.—Mr. M'Donnell moved "That the following four names be submitted to the Technical Instruction Committee, viz.:—Messrs. W. J. Gilliland, W. J. Fennell, H. Seaver, and N. Fitzsimons."—Mr. Tulloch seconded the motion, which was unanimously agreed to.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The Leeds and Yorkshire Architectural Society recently made an excursion to Giggleswick, to inspect the new chapel now being erected at the Grammar School. The donor is Mr. Walter Morrison, and the architect Mr. T. G. Jackson, R.A. The visitors were entertained by the head master (Rev. G. Style), and were conducted over the chapel by Mr R. Evans (clerk of the works).

APPLICATIONS UNDER THE 1894 BUILDING ACT.

AT the meeting of the Building Act Committee of the London County Council, held on July 29, being the day before the Council adjourned for the summer recess, the proceedings were governed by the clause in the Order of Reference, which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the Order of Reference. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Proposed New Street out of High-street, Portland Town.

That an order be issued to Mr. F. J. Stevenson, refusing to sanction the formation or laying out of a street for carriage traffic to lead out of the north-east side of High-street, Portland Town, St. Marylebone (for Lord Howard de Walden).—Agreed.

Lines of Frontage and Projections.

Strand.—Retention of a projecting illuminated sign at the third-floor level in front of No. 45, Strand, extending beyond the general line of buildings in that street (Messrs. Wylson & Long for Messrs. Anstiss).—Consent.

Hampstead.—An iron and glass hood over the entrance to a house known as "Kidderpore," Finchley-road, Hampstead (Messrs. W. E. & F. Brown for Mr. G. A. Dunn).—Consent.

Lewisham.—Ten houses, with shops on the ground floor, on the west side of Perry Hill, Catford, southward of the Two Brewers public-house (Mr. F. H. James).—Consent.

St. George, Hanover-square.—A wooden oriel window at the ground floor level, in front of No. 11, Stratton-street, St. George, Hanover-square (Mr. W. Woodward for Lord Welby).—Consent.

Clapham.—Three houses, with shops on the ground floor, on the north side of Battersea-rise at the corner of Limburg-road (Mr. G. E. Nield for Mr. W. J. Vokes).—Consent.

Clapham.—A one-story addition at the rear of the Prince Alfred public-house, Haines-street, Battersea, to abut upon Tweed-street (Mr. M. P. Saunders for Messrs. Watney, Combe, Reid, & Co., Limited).—Consent.

Deptford.—Fixing of two lamps at the White Hart public-house, Grove-street, Deptford, to overhang the public way in New-street and Grove-street (Messrs. Humphreys-Davies & Co. for Messrs. Style & Winch, Limited).—Consent.

Fulham.—Extension of the period within which the erection of one-story shops upon part of the forecourts of Nos. 19 to 26 (inclusive), Effie-road, Walham Green, was required to be completed, be granted (Mr. T. J. Evans for Mr. T. Davies)—Consent.

Kennington.—A one-story addition to the drill hall, No. 76, Lower Kennington-lane, Kennington, to abut upon Reedworth-street (Mr. G. A. Lansdown for the Commanding Officer of the 3rd Middlesex Volunteer Artillery).—Consent.

Mile End.—A railway station building on the north side of Mile End-road, Stepney, at the corner of Globe-road (Mr. C. A. Brereton for the Whitechapel and Bow Railway Company).—Consent.

Mile-End.—A railway station building on the south side of Mile End-road, Stepney, at the corner of Brantridge-street (Mr. C. A. Brereton for the Whitechapel and Bow Railway Company.)—Consent.

St. Pancras, West.—An iron and glass shelter over the entrance to No. 13, Cumberland-terrace, Regent's-park (Messrs. W. H. Lascelles & Co. for Miss A. Curtis).—Consent.

Woolwich.—Retention of two one-story shops (numbered 98B and 98C respectively) on the south side of High-street, Plumstead, abutting upon Mineral-street (Mr. A. L. Guy for Mr. W. H. O. Ainslie).—Consent.

Newington, West.—An extension of the period within which the erection of five projecting arc-lamps on the parapet wall in front of the Princess of Wales Theatre, Kennington Park-road, Kennington, was required to be commenced, be granted (Messrs. H. Greene & Sons, Limited).—Consent.

Strand.—A factory building on the east side of Martlett's-court, Drury-lane, at the corner of Crown-court (Mr. H. O. Ellis for Mr. L. Upcott Gill).—Refused.

Hackney, South.—A two-story cottage on the east side of Durrington-road, Clapton-park, Hackney, to abut upon Ashenden-road (Mr. H. M. Wakley for Mr. R. H. Barnes).—Refused.

Lewisham.—A house, with a shop on the ground floor, on part of the forecourt of No. 4, Belmont-hill, Lee (Mr. W. C. Banks for Mr. C. E. Banks).—Refused.

Wandsworth.—A block of residential flats on a site at the south-east angle of Franche-court-road, Earlsfield (Mr. G. F. Grover for Mr. T. Hailstone).—Refused.

Width of Way.

Woolwich.—Buildings at the rear of No. 1, Beresford-square, Woolwich, at less than the prescribed distance from the centre of Beresford-street (Mr. A. E. Parnell for Mr. M. Barnett).—Consent.

Southwark, West.—A warehouse building on the east side of Pontypool-place, Valentine-place, Southwark (Messrs. J. Hoare & Son for Messrs. J. Pascall, Limited).—Consent.

Whitechapel.—Two blocks of dwelling-houses on the south side of Finch-street, Spitalfields, at less than the prescribed distance from the centre of Hope-street, and to exceed in height the width of that street (Mr. J. L. Williams for Mr. H. J. Brown).—Consent.

Islington, West.—A two-story building, to be inhabited by persons of the working-class, at the rear of Nos. 42 and 44, George's-road, Holloway, at less than the prescribed distance from the centre of George-street-mews (Mr. S. Allen).—Refused.

Width of Way, Lines of Frontage, and Projections.

Strand.—Retention of an iron and glass sign at the Savoy Palace public-house, Savoy-street, Strand, extending beyond the general line of buildings in that street (Mr. J. E. Chevers).—Consent.

Chelsea.—An addition on an existing porch and entrance lobby at the side of No. 123, Church-street, Chelsea, at less than the prescribed distance from the centre of Elm Park-road (Mr. F. G. Knight for Mr. F. Moscheles).—Refused.

Width of Way and Space at Rear.

Whitechapel.—A cottage and stables on the south side of Winthorpe-street, Whitechapel, next the East London Railway, with the forecourt fence at less than the prescribed distance from the centre of the street, and with an irregular open space at rear (Mr. J. Woodard for Messrs. Harrison, Barber, & Co., Limited).—Consent.

Line of Frontage and Construction of Building.

Dulwich.—A wood and iron office to adjoin Dulwich railway station, Thurlow Park-road, Dulwich (Messrs. Marten & Carnaby).—Refused.

Formation of Streets.

Woolwich.—That an order be issued to Mr. H. O. Thomas sanctioning the formation or laying out of a new street for carriage traffic to form a continuation of Roydene-road, Plumstead (for Messrs. G. E. Arnold & Co.) That the name Roydene-road (in continuation) be approved for the new street.—Agreed.

Lewisham.—That an order be issued to Mr. J. W. Webb, refusing to sanction the formation or laying out of new streets for carriage traffic on part of the Crofton Park Estate, Crofton Park-road, Lewisham.—Agreed.

Buildings for the Supply of Electricity.

City.—An addition to the distributing station Nos. 82 to 84, Fenchurch-street, City, (Messrs. Clifton, Son, & Hope for the Charing Cross and City Electric Company, Limited).—Consent.

Westminster.—A temporary iron chimney shaft at the company's generating station, Millbank-street, Westminster (Mr. C. Stanley Peach for the Westminster Electric Supply Corporation, Limited).—Consent.

Height of Buildings.

Hoxton.—A warehouse building on the south-east side of Vestry-street, Hoxton, to exceed in height the width of that street (Mr. A. Keen for Mr. J. Kent).—Consent.

Strand.—A building on the east side of Martlett's-court, Drury-lane, at the corner of Crown-court, to exceed in height the width of Martlett's-court (Mr. H. O. Ellis for Mr. L. Upcott Gill).—Refused.

Cubical Extent and Construction.

Lambeth, North.—A one-story addition to a building on the south-west side of Walnut Tree-walk, Lambeth, which building and addition together will exceed in extent 250,000, but not 450,000, cubic feet, and which addition will be used only for the purposes of a standing place for motor cars and omnibuses and a blacksmith's shop (Mr. C. Barker for the Motor Traction Company, Limited).—Consent.

Separation of Building.

Bermondsey.—The formation, on the ground floor' of an opening in the party wall between Nos. 219 and 221, Borough High-street, without making the buildings in conformity with Sections 74 (2) and 77 of the said Act (Mr. T. W. Willis for Mr. F. H. Barker).—Consent.

Dwelling-houses on Low-lying Land.

Greenwich.—That the solicitor do prepare a licence under Section 122 of the Act to Mr. E. Petters, for the erection of three dwelling-houses on low-lying land at Blackwall-lane, East Greenwich.—Agreed.

The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

To the Editor of THE BUILDER.

BUILDING LAW.

SIR,—I think it time that architects, builders, and owners concerned should have opportunity of protest and correction against the growth of positive law, in contra-distinction to negative law in respect to building.

The perfect maze which building law has now assumed is a standing menace to the future production of property, and is acting as a weapon not only to destroy all individualism, but is forcing design and invention into such narrow ways as to entirely destroy all good work, artistic taste, and novelty. We were once controlled by Statutory Law constructed with full consideration and consultation of practical men, and which was no "hole and corner" institution. Now, by some means of doubtful power by the public bodies, a whole host of exact and positive clauses are made, all of various fads and ideas as may suit the guiding direction as it may come from one district or another.

The whole question is an irritating evil, because much of it is not based upon experience. Many of us who have spent our lives in the trade have learned and proved certain axioms of work which, after years of test, we are compelled to cast to the winds, simply to satisfy exact and positive law in any particular district. If I am compelled against my own experience and judgment to do bad work, what is more irritating?—especially when you retain an interest in the property affected. As an instance, every practical man knows of the absurdity of the 1894 Act of the London County Council in regard to the composition of plastering; the result has been of the worst possible character, for there are very few sound ceilings done under that *positive* direction; they are resonant, brittle, "alive" for years, and caustic to such a degree as to be for some work absolutely useless. Hard, and unyielding, the least shrinkage does them damage. If I can produce a better ceiling in my way, it is monstrous that the London County Council should exact that it is to be positively done in their way.

It is true that to prevent bad work legislation may be necessary; but let it be fairly constructed and of a negative character, so that genius and experience may get fair and full exercise.

Then, again, some district by-laws are claused with positive directions as to timber sizes—a monstrous stupidity—often not stock sizes. Houses of a certain class should be required to carry over so many square feet of floor space a certain load without extreme flexure, leaving the size and skill of the construction to the operator. At present your house may conform to the law and yet be a bad building.

Then, again, I notice some by-laws now in print, which have not passed the scrutiny and the signature of the Home Secretary with the statutory six weeks' delay for objections, but are now signed as allowable by the Local Government Board under the authority of their general order of May 26, 1877, whatever this may mean.

Now, sir, here is perhaps drastic positive law, possibly stupid to a degree, emanating from the brain of some insignificant jack-in-office in an Urban Council, signed by a Mayor and a Town Clerk, and with the above dubious official concurrence a copy is handed over as a guide and counsellor to a man who perhaps built good houses before the author was born, and is asked to construct his own houses against his experience and conviction of rectitude in a way as though public bodies were the owners and not himself.

What I contend is that as the statutory law exists, no by-law should be signed unless oral examination has taken place of architecs and builders concerned in equal proportion; so many according to the population or area affected.

Very much more could be written upon this very important matter did space and time permit.

EXPERIENTIA.

PENALTIES IN BUILDING CONTRACTS.

SIR,—In a contract under the usual terms and under agreement providing penalty for delay on non-completion, and where it is proposed to enforce this: (1) In issuing certificates should this amount be considered as a deduction from the amount of contract, and pending the final certificate be so deducted by not issuing certificates for the full amount of contract? (2) Is an architect liable to his client if he issued certificates and took no account of the penalty if he thought the contractor had used fair diligence, and could the amount be recovered from the architect? ENQUIRER.

*** The deduction for penalties should be made on the final certificate, which should reserve a sufficient amount to leave a margin for penalty deductions, if enforced. It is very seldom that the contractor is without some kind of more or less logical defence in regard to delays, which ought at all events to be heard and considered. To attempt to deduct in proportion on each certificate would be raising the question two or three times over instead of settling it once for all at the final settlement of the accounts; and the architect would certainly not be "responsible to his client" for leaving the penalty deductions over to the final settlement. If the client attempted to make him so, he would take a very foolish and, in our opinion, untenable position.—ED.

THE PROPOSED WIDENING OF PICCADILLY.

SIR,—In your last issue a road is suggested leading from Piccadilly to the Mall along the back of the houses in Arlington-street. This formed part of my scheme for laying out the ground around the Queen Victoria Memorial, which you did me the honour of publishing in your issue of April 27 under the undersigned motto.

I was about to suggest that Pall Mall be continued on through Cleveland-square to the Park, but have been anticipated by a writer in the *Times*. This, in addition to being an improvement from the traffic point of view, would add very much to the effect of Pall Mall, bringing the entrance front of Bridgewater House in line with it, and provide an open space in front of St. James's Palace.

"PLAN THE BASIS OF DESIGN."

PORTLAND CEMENT TESTING.

SIR,—Referring to the letter signed "The Writer of the Article" in your last issue, it does not follow that an office boy or labourer can do all that is necessary in testing Portland cement because the writer's tests were carried out by labourers, as it is obvious from his own letter they must have been skilled men, and doubtless worked under his direction.

I quite agree that two men will make up briquettes of the same cement and get very different results, and I shall prove this by getting an ordinary labourer to make one lot and a skilled labourer who has been taught to make another lot. I did not suggest a chemist was required for the testing.

Also, in reference to the writer's observation that "it appears not so much to depend upon whether he is a labourer as upon whether he has gauged long enough to have obtained the necessary experience and skill," I should like to say that in nearly every consignment I test, the cement varies a good deal, and the quantity of water required for gauging one lot would be altogether unsuitable for another lot.

I am glad the writer of the article advocates laying down the cement in bulk for a month or two, not because it is necessary *but as a safeguard*, as he puts it.

My experience has taught me that when not absolutely necessary, placing the cement in bulk on a wooden floor and occasionally turning it during three or four weeks will improve it very considerably, and this is proved by the higher tensile strain obtained.

But, in conclusion, I would suggest that it would be very poor policy for labourers to test cement to detect its improper mixing, burning, and grinding by labourers, as an experienced tester should do the testing. ROBERT H. REED.

County Bridge Works,
Fordingbridge, Hants.

SIR,—Referring to Mr. Line's letter last week, if he has any difficulty in getting his cement tested in Birmingham, and would prefer having an operative to test cement for himself, he could probably get the address of some one who would give such training or recommend a tester already trained, if he applied to firms supplying the necessary apparatus, such as Messrs. Townson & Mercer, 34, Camomile-street, E.C. "CEMENT."

SIR,—We notice a letter from Mr. Charles A. Line, local concessionaire of the National Opalite Glazed Brick and Tile Syndicate, who is making enquiries about the use of Portland cement for fixing Opalite. If he will apply personally to the Adamant Co.,

Ltd., Commercial-street, Birmingham, or the British Opal Wall Glazing Co., Ltd., 12, Warkmouth-street, London, he will find they can fix Opalite without Portland cement or Robinson's, and guarantee it not to swell and displace the opal; a process which, however, has not been secured in the cheap manner he indicates, but at great cost of both labour and money.

Large quantities of this work have been executed in Birmingham and elsewhere. J. WILKINSON.

"GILLOW'S."

SIR,—We are greatly obliged to you for the flattering notice of our little book contained in your journal of the 3rd inst.

With reference to the concluding paragraph, viz.:—

"If Messrs. Gillows wish to retain their hereditary position, however, there is one move which they will probably have to make, to keep with the times, viz., to go to first-class artists for designs, and to give names and the individual credit to the designers. Hitherto, if we are not mistaken, they have gone upon the old system of putting out furniture as the design of the firm and not of individual artists; a system which, for the highest class of work, is doomed:—"

We desire to say that in our studio we possess artists of exceptional ability, a fact you would readily admit if you will favour us with a visit to our galleries. There is no concealment of an artist's name; on the contrary, in the case of any important work, we invariably introduce him to the client. It may, perhaps, be interesting for you to know that many of the most successful designers of the present day have passed through our studios.

GILLOW & CO.

The Student's Column.

GAS AND GAS FITTINGS.

6.—PRODUCER-GAS MANUFACTURE, MOND GAS, OIL-GAS, AIR-GAS, ENRICHMENT WITH LIGHT OILS.

PRODUCER-GAS MANUFACTURE.—The description of producer-gas obtained by blowing air through heated coke has already been described as a by-product in the old process of water-gas manufacture. Instead of separately making a high-class water-gas and a low-class producer-gas by alternately blowing air and steam through the heated fuel, a higher class producer-gas, consisting of water-gas and the producer-gas previously described, may be made by passing a regulated mixture of steam and air through the fuel, the heat evolved by the combustion of the carbon with the atmospheric oxygen being made to balance the heat absorbed during the decomposition of the steam. An excess of air has to be used to compensate for loss of heat through unavoidable causes. A large number of generators or producers have been invented to manufacture gas of this description, and the gas produced is usually known by the name of the inventor of the plant—*e.g.*, Mond gas, Siemens gas, Dowson gas, &c.

In some producers anthracite or a more bituminous fuel is used instead of coke, as, for instance, in the Mond producer, in which cheap coal slack is employed; and the hydrocarbon gases evolved from the fuel enrich the producer-gas to a certain extent, and increase its value. The tar may be recovered by cooling and washing the gas, or may be destroyed by passing the gas through a sufficient thickness of heated coke.

The following table shows approximately the composition and relative heating values of natural gas and of the gases most commonly used in this country for lighting, heating, and motive power; but it must be remembered that in every case the composition of the gas is variable:—

	London Coal-Gas.	Natural Gas of U.S.A.	Water-Gas.	Mond Gas.	Dowson Gas.	Siemens Gas.
Hydrogen	52·85	20·62	49·17	24·8	18·76	8·6
Methane.....	33·88	73·28	·31	2·3	0·31	2·4
Unsaturated Hydrocarbons....	3·97	4·30	nil	nil	0·31	nil
Carbon monoxide	5·34	1·00	43·75	13·2	25·07	24·4
Carbon dioxide..	nil	0·80	2·71	12·9	6·37	5·2
Nitrogen	3·96	nil	4·05	46·8	48·98	59·4
	100·00	100·00	100·00	100·0	100·00	100·0
Gross Calorific value, B.T.U. per cubic foot..	624	700	304	155	150	135

The difference between the heating value of coal-gas and carburetted water-gas of similar illuminating power is shown by the following figures published by Dr. Colman:—

	Coal-Gas.		Carburetted Water-Gas.
Illuminating power.....	17·34	..	17·46 candles.
Heating value (gross)....	158·9	..	142·5 } calories per
" " (net)	145·7	..	132·9 } cubic ft.

To convert the calories into British thermal units multiply by 4 (or, more correctly, 3·968).

The table (see below) given by Bryan Donkin in his book on "Gas Engines" is interesting as showing the variations in the composition of the coal-gas supplied in different localities. The analysis of London gas supplied by the Gas Light and Coke Company needs revision, as the carbon monoxide now commonly amounts to 9 or even 12 per cent., owing to the addition of large proportions of carburetted water-gas.

Producers.—In the older forms of producer the fuel usually rested on firebars through which the air supply entered. In order to make the draught sufficiently powerful to carry the producer-gas forward an overhead cooling tube was provided. The gas ascended to this tube, and after being cooled was allowed to descend, the weight of the cold descending gas being sufficient to create a "pull" on the hot gas ascending through the fuel, and to thus increase the current of air drawn through the firebars. In these "open" producers the rate of manufacture is slow owing to the slow speed of the air draught, and the small quantity of steam permissible. Better results are obtained by closing the ashpit and admitting regulated currents of air and steam under pressure. The air and steam are supplied together. A jet of steam is blown into a tube, and owing to the force of its impulsion draws air into the tube with it, and the steam and air pass together into the producer. The size of the jet is adjustable, so that the proportion of air to steam can be varied as required. By using a hollow jet of steam instead of the so-called "solid" jet formerly used, a given quantity of steam can be made to draw in a larger volume of air.

Mond Gas.—Hitherto producer-gas has in this country been manufactured on the works on which it is to be used, and is usually consumed while still hot. The promoters of the Mond scheme propose to supply a large area in Staffordshire, including several important towns, with Mond gas for power purposes. The maximum price is to be 3d. per 1,000 cubic feet, when not less than four million cubic feet per quarter are used, and 4d. per 1,000 cubic feet for smaller quantities. It is proposed to distribute the gas in steel mains under an initial pressure of 7 lbs. per sq. in. in order to limit the size of the mains required. The difference between this pressure and that of 1 in. to 4 in. of water under which coal gas is commonly supplied is shown in the following table:—

Weight of a column of water in lbs. per square inch. (Water at maximum density at 3·9 deg. C.)

1/10th	in. water	= 0·00361	lbs. per sq. in.
1	in. "	= 0·0361	"
27·7	in. "	= 1·0	"
194	in. "	= 7·0	"
554	in. "	= 20·0	"

According to Sir F. Bramwell, the gas is to be sent out under an initial pressure of about 7 lbs. per sq. in. from the distributing stations, and at the point of delivery to the consumers is to be reduced to about 2 lbs.

Mond gas is a producer-gas made with the aid of an unusually large quantity of steam, about 2½ tons of steam being blown into the fuel for every ton of coal slack consumed. A large quantity of ammonia is present in the gas produced, and this is recovered and subsequently converted into sulphate of ammonia, the sale of which is expected to almost cover the cost of the coal slack.

Oil-Gas.—Instead of being used for the manufacture of carburetted water-gas, oil may be directly decomposed into a gas very rich in illuminating hydrocarbons. The oil-gas may be used without admixture with other gas, or may be used for enriching gas of poorer quality.

Pintsch's System and Pope's System.—The oil-gas produced by these systems is extensively used for lighting railway carriages, lighthouses, and buoys. Even after compression it has an illuminating power of about 7½ candles per cubic foot when consumed in the ordinary railway carriage-lamps. A gallon of oil, such as Russian Solar Distillate or Scotch gas oil, yields about 82 cubic feet of 50-candle gas. The gas is stored for use in steel cylinders under a pressure of about ten atmospheres (150 lbs. per square inch). When subjected to this compression about 1 gallon of tarry liquid, known as "hydrocarbon," condenses from every 1,000 cubic feet of gas compressed, and the illuminating power of the gas is reduced from 50 to about 38 candles per 5 cubic feet rate.

The oil-gas is manufactured by vaporising and decomposing the oil in specially constructed retorts heated to a cherry red heat. It is now a common practice to mix about 20 per cent. of acetylene with the oil-gas before compression, the illuminating power of this mixture being double that of the plain oil-gas.

Peebles Process.—By this process, the invention of Messrs. Young & Bell, oil or tar is converted into gas and coke, the gas being washed with oil or tar, which is itself subsequently decomposed into gas and coke. One ton of tar from Durham coal is said to yield 15,000 cubic feet of 25-candle gas and 15 cwt. of good quality coke; and one ton of Scotch gas oil to yield about 22,000 cubic feet of 90-candle gas, the illuminating power being calculated from the enriching value of the gas when mixed with low quality gas. About 5½ cwt. of hard graphitic coke is obtained per ton of oil.

Oil-gas is so rich in heavy hydrocarbons that it burns with a very smoky flame in burners which are suitable for coal-gas, and has therefore to be consumed in burners with very small orifices, such as the No. 0 or No. 00 Bray burner, and at a rate of about 1 cubic foot per hour. Professor Lewes gives the following as the composition of oil-gas as

Chemical Composition of Coal-gas in Various Cities and Towns in Percentage by Volume.

(Donkin's "Gas, Oil, and Air Engines.")

Constituents in Gas. Percentage by Volume.	London Gas Light and Coke Co.	London Society of Arts Trial, 1888.	Manchester.	Kilmarnock Trial. Professor Kennedy.	Gas Motoren Fabrik Cologne (Slaby).	Bonn (Clerk).	Dresden (Schöttler).	Hanover (Schöttler).	Hoboken, New York (Brookes and Steward).	Paris (Peclet).	Paris (Witz).
Heavy Hydrocarbons....	4·41	3·77	6·46	5·55	3·10	4·75	3·00	3·17	6·60	5·80	5·50
Marsh-gas, CH_4	37·64	37·34	34·90	42·80	34·40	43·12	33·40	37·55	37·30	33·10	32·30
Hydrogen, H	47·99	50·44	45·58	43·60	56·90	39·80	48·70	46·27	39·50	50·10	52·80
Carbonic Oxide, CO	3·75	3·95	6·64	4·30	5·20	4·66	8·00	11·19	4·30	6·30	5·60
Carbonic Acid, CO_2	—	0·51	3·67		—	3·02	1·50	0·81	2·70	1·50	—
			H_2S						and impurities		
Oxygen, O.....	0·26	—	0·29	1·05	—	—	1·40	—	1·40	0·50	—
Nitrogen, N	5·95	3·98	2·46	·70	—	4·65	4·00	1·01	8·20	2·70	3·80
Totals	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

made by the Pintsch and Young systems respectively :—

Composition of Oil Gas.

	Pintsch Gas.	Young Gas.
Unsaturated hydrocarbons	35·65	43·83
Saturated hydrocarbons	45·37	36·30
Hydrogen	12·44	16·85
Carbon dioxide ...	0·74	0·63
Carbon monoxide	0·60	0·00
Oxygen	2·00	1·14
Nitrogen	3·20	1·25
	100·00	100·00

Air Gas.—In America, illuminating gas is often made by passing air at ordinary temperatures over light petroleum spirit. This is, however, a crude and wasteful method of using the oil, and many accidents have occurred owing to an explosive mixture of air and petroleum vapour having been formed in some part of the apparatus.

The Kitson Light.—This light is produced by heating a large mantle to incandescence by means of an oil flame rendered non-luminous by causing the oil vapour to draw in by its injecting action the necessary volume of air just before it enters the burner. The mantle is similar to that used for the Welsbach incandescent gas light, but is larger. The oil is placed in a cylinder, and air is then pumped into the cylinder. The pressure of air in the cylinder (about 50 lbs. per square inch) forces the oil up a pipe of very small bore, and injects it into the lamp, where it passes through a tube located a short distance above the mantle and, heated by the waste combustion products, is vaporised. The compressed air is not used for combustion of the oil. The apparatus is compact, and has the advantage of not requiring any distributing pipes. It is, therefore, useful for lighting works not supplied with gas, or for works of a temporary nature where a powerful light is required without incurring the expense of laying gas service-pipes. The hissing noise made by the lamp makes it unsuitable for most indoor work. The illuminating power of the light is about 1,000 candles, and the estimated cost of the oil used is about 1d. per hour.

Enrichment of Gas with Light Oils.—Instead of decomposing heavy oil into a rich gas and using it to enrich low quality gas, the gas may be passed over liquid light oil, or brought in contact with oil which has been vaporised, but not decomposed, with the aid of steam. These light oils are mostly distillates from American petroleum, and are sold under fancy names. *Carburine* has a boiling point of about 70 deg. C. and a specific gravity of about 0·68. *Gasoline* has a boiling point of about 40 deg. C. and a specific gravity of about 0·65. *Petroleum Spirit* a boiling point of about 95 deg. C. and a specific gravity of about 0·70. Commercial *90 per cent. benzol* contains, according to Butterfield, about 70 per cent. benzene and 25 per cent. toluene, and has a boiling point between 82 and 112 deg. C., while its specific gravity varies from 0·882 and 0·885.

The process of enriching gas with oil vapour is termed "carburetting." In Germany, benzol is largely used for carburetting plain water-gas. The gas may be carburetted with light oils at atmospheric temperatures, but in this country it is usual to vaporise the oil by steam heat. In London, all gas supplied north of the Thames is required by Act of Parliament to have an illuminating power of not less than 16 candles when consumed in a standard argand-burner at a rate of 5 cubic ft. per hour. The gas from the coal used in London has an illuminating power of 14 to 15 candles, and it is therefore necessary to raise it to about 16½ candles by carburetting it with light oil or by mixing it with rich carburetted water gas. Mr. H. Leicester Greville states that 1 gallon of petroleum spirit vaporised in a Price carburettor is capable of enriching 10,286 cubic ft. of coal gas from 16 to 17 candle-power.

BOOKS RECEIVED.

BY-LAWS AS TO HOUSE DRAINAGE, &c., MADE BY THE LONDON COUNTY COUNCIL. Annotated by Gerard J. G. Jensen, C.E. (The Sanitary Publishing Co.)

THE MANAGEMENT OF ENGINEERING WORKSHOPS: Six lectures by Arthur H. Barker. (Published by the Institution of Junior Engineers.)

NORWEGIAN GRANITE AND STONE.

THE export of hewn granite from Norway last year was somewhat less than in 1899. The same may be said of the selling price, which, both in and out of the country, was somewhat lower. The quantity exported in 1900 from the Smaalene granite quarries was 86,499 tons, of which 48,291 tons were shipped at Fredrikstad, 29,343 tons at Fredrikshald, and 8,865 tons at Sarpsborg. In addition to these totals there were exported from the Drammen Fjord 8,694 tons, from Christiania 4,163 tons of so-called Labrador, from Laurirg 4,635 tons, and a little from other places. The greater part goes to the United Kingdom. In recent years Germany has taken but little, preferring, it is said, to develop her own quarries. The largest Norwegian exporters have formed an association for the export of kerb-stones only. There exists also a workmen's association, called the Granite Exporters' Association, to control labour, employing about 3,600 men on the east side of the Christiana Fjord, but less than half of these work north of the Swedish frontier, the rest over the frontier, in Sweden. Two strikes, each of two and a half months' duration, occurred in 1900. The total value of the granite exported is about 115,000*l.* The quarrying of soapstone is reported on the increase. Nearly all of it is used in Christiana for building and decorative purposes, as also for fireplaces and stoves and for fireproof stone. The export of soapstone has also begun. One firm shipped 1,250 tons last year. Very little marble was reported to have been quarried in 1900. The bulk of the Norwegian exporters of kerbstone have formed an association under the style of "The Norwegian Kerb Company," with a head office in Christiana. The object of the company is to regulate the production of kerb in accordance with the demand, and also to control all sales of same, which are now effected through the company's office. The annual report of Mr. Berentsen, British Vice-Consul at Stavanger, includes the following laconic passages :—"The Stavanger Stenhuggerier, mentioned in my last report as working paving stones and stones for house-building purposes, has delivered some paving stones in this town, and as far as I know it proved a success. If any town or Corporation in the United Kingdom is in want of paving stones I would recommend them to apply to the above address. The brick-stone manufactories have been working very hard at Sandnæs, near here. If brick-stones are required anywhere in the United Kingdom, I recommend application to the Sandnæs factories. Addresses, samples, and prices may be had on application to the Vice-Consulate."

GENERAL BUILDING NEWS.

RESTORATION OF ST. MARY'S, CARDINGTON.—The demolition of the body of this church, together with the old tower, has been made necessary by the unsafe condition of much of the masonry in the south, east, and west walls of the south aisle. It was at first intended to rebuild the tower on its old site, but the soil had been so honeycombed by interments that this was considered inadvisable, and it was then decided to throw the tower-site into the nave, and to add a new tower to the west end, a north aisle being also added. The old vault of the Whitbread family, north of the old tower, was filled up, and a north transept—forming a memorial chapel—was erected over it, for the reception of the principal Whitbread monuments. The old windows in the chancel have been reconstructed in precisely the same position as before, with the old materials. A number of large and vigorously designed ancient gargoyles have been introduced into the external cornice of the chancel; and a few of the old leaden water pipes—bearing the dates, "S.W. 1761," "S..W. 1780,"—have been again used round the chancel roof. Internally, the large Norman arch, which divided the old tower from the nave, has been removed to the west end of the nave; which opens into the new tower. It has been most carefully reconstructed stone by stone, the only change effected in it being the recessing of the edges, converting the arch into one of a double order. The new tower rests on a bed of concrete, 45 ft. square by 11 ft. thick. The work of the tower foundation, as well as that of the foundations of the four nave pillars, was carried out from plans prepared by Mr. James Briggs, M.Inst.C.E., Derby. In the construction of all portions of the church the best and most durable materials have been employed. The stone for the walls is from Tansley Moor, Matlock, and is laid in random-coursed work; all the new dressings are of Ketton stone (Rutlandshire); the base on which the oaken pulpit stands is from Beggar's Well, Staffordshire; the steps on which the font stands are of stone from Hollington, Staffordshire, while the font itself is of hard white Mansfield stone. No ordinary mortar, nothing but the best cement, has been used anywhere in the building. The outer roofs and waterpipes are of copper, and the locks are of gun metal. The whole of the work of plans and designs—including new tower superstructure, north aisle, transept, and south porch, and all new architectural features and details—has been entrusted to Mr. George Highton, architect. In the belfry stage are eight bells, which have been recast by Messrs. Taylor, of Loughborough, with the ancient and rather curious inscriptions. On the south side of the tower is the sundial erected by Samuel Whitbread in 1782, with the legend "Our days upon earth are as the dew." A few feet below this dial is a smaller one, discovered in the south wall of the churchyard, and which is a rare and well-preserved example of an Anglo-Saxon sundial. The gnomon is wanting, but the dial is otherwise in comparatively good condition, and at one point bears a small cross indicating the chief Saxon hour of prayer.

VAGRANT WARDS, LEEDS.—The foundation-stone of the proposed vagrant wards at the Leeds Workhouse was laid on the 22nd ult. The new buildings, which will probably cost about 10,000*l.*, are being erected by Mr. J. T. Wright, from designs of Messrs. Thomas Winn & Sons. They will stand in the lower part of the workhouse grounds, near to Gledhow-road, and will be of brick, with stone dressings, and glazed brick inside. There will be thirty sleeping cells for the men and twenty stone-breaking cells on that floor, together with twenty sleeping cells for females, as well as lavatories, bathrooms, &c.

TECHNICAL INSTITUTE, CLEETHORPES. — The foundation-stone of the new Technical Institute for Cleethorpes was laid on the 23rd ult. The building is being erected by Mr. W. Ion, and will, it is estimated, cost 2,000*l.* It is to include classrooms, laboratory, lecture theatre, and other necessaries to meet the demands of the times. It will be a two-story structure, 40 ft. high. Mr. F. Croft is the architect.

WORKHOUSE INFIRMARY, DORKING.—The new infirmary which has been erected for the accommodation of the sick poor in the Dorking Union was opened a few days ago. The building, which has been erected at a cost of over 10,000*l.*, is situated at the rear of the workhouse buildings, in which up to now the sick have been nursed in a series of sick wards. The structure, which is of red brick with stone dressings, is of a total length of 185 ft. and of varying depths, its deepest point extending to 38 ft. The centre part is carried a story higher than the two side wings. On the ground floor, which is approached by a vestibule and entrance hall, are situated male and female wards, bathrooms, &c., those for females being situated on the left hand side and for males on the right. The first floor is approached by two staircases. Here the wards are divided into two blocks, one for males and the other for females, there being also separate wards for patients of both sexes in acute suffering, each set of wards being provided with its own bathrooms and sanitary annexes. The second floor is devoted to the nurses' bedrooms, sitting-rooms, bathroom, &c. Altogether there is accommodation in the new building for about sixty patients—thirty male and thirty female. In addition there is a lying-in ward on the ground floor at the rear of the main building, at each end of which is a tower forming the sanitary offices. The largest wards are those on the first floor, which measure 36 ft. by 24 ft., those on the ground floor being about 24 ft. by 24 ft. Mr Percy Adams, of London, was the architect, and Messrs. Kerridge & Shaw, of Cambridge, the builders.

ENLARGEMENT OF HOSPITAL, MIDDLESBROUGH.—The Marchioness of Zetland opened, on the 29th ult., a new wing which has been added to the North Ormesby Cottage Hospital, Middlesbrough, at a cost of over 4,500*l.* In the interior, the original passage entrance has been enlarged into a hall, the floor of which is covered with a marble mosaic pavement, and the hall gives access to corridors branching to the right and to the left. In addition to new wards on the first floor, there are seven rooms for the use of the nursing staff as sitting and bedrooms, and above these seven other rooms for the use of the large staff of servants. A part of the original building has been converted into a temporary operating-room. Mr. J. Mitchell Bottomley, of Middlesbrough and Leeds, the architect to the institution, has superintended the work; the contractor being Mr. King, of North Ormesby. Mr. E. Jones, of Middlesbrough, has acted as the clerk of works.

FIRE STATION AT HOMERTON.—Mr. J. D. Gilbert, Chairman of the Fire Brigade Committee of the London County Council, recently laid the memorial stone of a new sub-station now being erected at High-street, Homerton. The site cost 1,750*l.*, and the estimate of the architect, Mr. W. E. Riley, was 8,000*l.* Messrs. Martin, Wells, & Co. undertook the contract for 8,126*l.*

CHADWELL LUNATIC ASYLUM. — The plans for this asylum, which was officially opened on the 1st inst., were originally prepared in 1894 by Mr. Lewis Angell, the then Borough Engineer for West Ham; but were not finally approved by the Commissioners of Lunacy until May, 1897. The foundations for the buildings were constructed and the east entrance lodge erected by Messrs. Gregar & Son, builders, Stratford, between July, 1897, and July, 1898, at an expenditure of 13,728*l.* 9s. 8d. On August 3, 1898, the foundation-stone of the first portion of the buildings, for which the tender of Messrs. Leslie & Co., Ltd., contractors, Kensington, in the sum of 209,531*l.*, had been accepted by the committee, was laid. The buildings cover an area of about ten acres, and have a width of about a quarter of a mile from east to west, and one-eighth

of a mile from north to south, the main corridors being about a mile in length. They provide accommodation for 800 patients with the necessary staff, and consist of administration block, forming the centre of the buildings, containing in the front the chief medical officer's, steward and clerk's offices, committee-rooms, waiting-rooms, dispensary, laboratories, museum, library, billiard-room, and apartments for assistant medical officer, and the matron's rooms. Behind these, forming the centre of the block, is the recreation hall, with floor space 80 ft. by 40 ft., and a stage 40 ft. by 21 ft., and the rooms for male and female attendants, the kitchen, serveries, sculleries, dairies, vegetable, meat, and general stores, bakery, with flour store over, sewing-room, and other offices. At the rear are the laundries, boiler and dynamo houses, water tower, and workshops for various trades. The patients' quarters are built on both sides of the administration block, to which they are both connected by extensive corridors. The accommodation is similar on both sides, and includes sick and infirm, acute, epileptic, and chronic blocks. Large dayrooms and dormitories, baths, and sanitary accommodation are provided in each block. The dayrooms vary in size from 90 ft. by 27 ft. to 36 ft. by 20 ft., and the dormitories from 45 ft. to 80 ft. long by 28 ft. wide. In addition to the above, an isolation block has been erected with male and female wards, convalescent-rooms, attendants' rooms, kitchen, scullery, sanitary offices, &c. The officers' residences are erected some little way from the main buildings, and consist of detached houses for medical superintendent, steward, chief attendant, and engineer; eight semi-detached houses for married attendants, and lodges at the north and south entrances. The church is situate in the centre of the site, about 120 yards from the front of the administration block, and has seating accommodation for 600 persons. The water supply for the domestic purposes of the asylum is obtained from an artesian well in the base of the water tower. In sinking the well, chalk was reached at a depth of 210 ft., and the boring was continued 140 ft. into the chalk, making a total depth of about 350 ft. The normal level of the water is about 70 ft. below the ground surface, and it is first raised by a compressed-air plant, driven by electric motors, into a tank with a capacity of 11,000 gallons in the base of the water tower, and from thence again raised by an electrically driven three-throw pump a height of about 90 ft., into the large storage tank, capable of containing 32,000 gallons, at the top of the water tower. From this tank a "circuit main" is run round the whole of the buildings, in each block of which a galvanised iron tank is fixed with connexions to the "circuit main." From these tanks, branch mains and services are taken to supply all the various fittings, fire hydrants being fitted throughout the buildings and in the yards. The fire installation is arranged on the "ring main" principle, and the pressure in the pipes is maintained by means of a large steam fire-pump in the engine-room. In case of failure of this pump, the pressure from the water-tower can be placed on the main, and the supply obtained from the water company to meet cases of emergency. A considerable proportion of the rainwater from the roofs of the buildings will be collected for laundry purposes by a separate system of drainage, and discharged into a covered reservoir, 91 ft. by 30 ft. by 13 ft., with a capacity of 200,000 gals. From thence the water passes through filters and is raised by an electrically-driven pump into tanks in the laundry blocks capable of holding 18,000 gals. The buildings are heated throughout on the low-pressure hot-water system. A multitubular heater (Messrs. Z. D. Berry & Sons' improved pattern), supplied with steam from the main boilers, is fixed in the heater-room of each block for generating the necessary hot water. Flow and return mains are taken from the heaters and connected up with the various radiators fixed throughout the buildings. The boilers are constructed to work at a pressure of 120 lbs., and they were supplied by Messrs. Spurr, Inman & Co., of Wakefield. A Green's Economiser of 160 tubes is placed at the rear of the boilers. The electrical installation, including the wiring of the buildings and the telephones, has been carried out under the superintendence of Mr. J. K. Bock, Borough Electrical Engineer. The number of lights wired for is over 3,000, the work being carried out by the Council's own workmen. From the main switchboard in the engine-room, a separate concentric, lead-covered, paper-insulated cable is run to a distribution board in each block, and also a distribution board in each detached building. From these boards the branch circuits to supply the lights are taken, the wires being drawn into steel tubing, so arranged with joint boxes, pulling-in boxes, &c., that, in the event of any failure in the circuit, the wires can easily be replaced without disturbing any plaster or woodwork, &c. In every case the rooms and corridors depend on more than one circuit for their supply. Hot-water supplies are provided for all baths, sinks, slop sinks, &c., from multitubular heaters fixed in the heater-rooms of each block. The heaters are of similar type to those used for the heating apparatus. The laundries are fitted with five washing machines, four hydro-extractors, soaking and rinsing tanks, boiling coppers, washing troughs, three box mangles, ironing machines, ironing stoves, &c. The drying closets contain seventy-eight drying horses, all heated by steam, the horses being constructed on the "over-carried" principle. The machinery and shafting throughout is driven by electric motors. The work in connexion with the heating apparatus, hot and cold water mains and services, steam and condenser mains, laundry machinery and apparatus, cooking apparatus, kitchen fittings and bakery, fire installation, &c., has been carried out by Messrs. Z. D. Berry & Sons, the Albion Works, Westminster; and the artesian well and compressed-air plant in the water tower by Messrs. C. Isler & Co., Bear-lane, Southwark. The total cost of the whole of the works when completed is estimated at 300,000*l.*

CORNWALL COUNTY ASYLUM, PROPOSED EXTENSIONS.—Additions are to be made to the present County Asylum buildings at Bodmin, Cornwall, comprising separate detached blocks for sick and infirm, reeent and acute, chronic epileptic, and other classifications of patients, together with assistant medical officer's residence, waiting-rooms, recreation and dining-hall, kitchens, offices, staff-quarters, workshops, stores, boiler-house, &c. Mr. Silvanus Trevail, of Truro, is the architect, and the tender of Messrs. Pethick Bros., of Plymouth, has been accepted at 87,973*l.*

PUBLIC BATHS, LATIMER-ROAD, WIMBLEDON.—The site of this building has a total frontage of 200 ft. and a depth of 100 ft. Of this 140 ft. have been occupied by the present buildings, leaving a vacant site with 60 ft. frontage for extension, if required. Separate entrances are provided for men and women under the control of a central ticket office leading to waiting rooms for each sex. By this arrangement it will be possible, by locking respective doors, for men to use their slipper baths when women are using the swimming bath, and *vice versa*, with perfect privacy. The swimming bath hall is 120 ft. long and 58 ft. wide and the pond has a water area of 100 ft. by 40 ft. with a depth of water varying from 6 ft. 6 in. to 3 ft. 4 in. The water is warmed by the injection of steam. A shower and foot bath are provided for bathers using the swimming bath. There are sixty-seven dressing boxes ranged round the swimming pond, over which a gallery is provided to enable the public to view swimming entertainments. During the winter months the pond will be floored over, and the hall will be available for meetings, dances, concerts, &c., with seating accommodation for 700 on the ground floor and 300 in the gallery. In connexion with this arrangement an additional entrance is provided with ticket office at the south end of the building, to avoid any interference with the working of the slipper baths, which will be open throughout the year. Thirty slipper baths are provided, viz., twenty men's and ten women's, approached from the respective waiting rooms. The superintendent's office is placed between the men's and women's entrances. The establishment laundry is connected with the various departments by means of a covered way. It is fitted with the most approved steam appliances, worked by an engine in the basement, for washing the towels, bathing dresses, &c., used in the building. The whole of the building is warmed by steam pipes and radiators, and steam is also used for heating the water used in the slipper baths and laundry. There are two boilers fixed in the basement, viz., a 22 ft. Lancashire and a 15 ft. Cornish; the former is capable of supplying the whole of the steam required, and the latter will be held in reserve. The whole of the building is fitted with the electric light, and the current is supplied from the Wimbledon Urban District Council's mains. Mr. R. J. Thomson, Hill-road, Wimbledon, is the architect.

WESTINGHOUSE WORKS, TRAFFORD PARK, MANCHESTER.—The Lord Mayor of London recently laid the corner-stone of the Westinghouse Works at Trafford Park, Manchester. The works are situated on a portion of the old Trafford Park estate, a site covering about 130 acres having been acquired for the purpose. The buildings run almost due north and south; the northern ends are permanent and brought up into line; the other ends might be termed temporary, as it is from here that the buildings will be extended and increased in length as required. The works proper are located in six buildings, all of rectangular form. On the extreme east is the iron foundry, 170 ft. wide and 580 ft. long, where plant will be installed capable of turning out and handling the huge castings required in the largest sizes of electric power machinery. Next to the iron foundry are the smaller brass foundry, malleable iron foundry, pattern shop, steel foundry, and forge. The two last are built end to end, forming a building 170 ft. wide by 580 ft. long. The next building is the machine shop. It is 430 ft. wide by 900 ft. long, and will be equipped with the most modern machine tools, large and small, all electrically operated. It is divided longitudinally into bays. The side bays are arranged with two stories, and are arranged for the machining and finishing of the smaller parts of machinery; the centre bay is arranged for the machining of large parts and the erection of the largest plant manufactured. In addition to the six buildings which have been mentioned, there are two others—one the office building, 50 ft. wide by 250 ft. long, set in front of the machine shop; and the other, box factory and stores, 60 ft. wide by 270 ft. long. The office building will accommodate the clerical staff, shipping department, drawing offices, and also have certain fireproof departments in which the works records will be kept. Houses for the workmen are being built by the Trafford Park Dwellings Company, Limited, who have acquired some 120 acres of land, whereon will be erected some 1,100 dwellings. About 300 of these are completed, and 300 more are being rapidly pushed forward. Arrangements are also being made for the erection of some better-class cottages for the use of foremen, for the erection of a large hotel to accommodate commercial travellers, also schools, clubs, and recreation grounds. In all there will be some 5,000 workmen employed, the works being mainly devoted to the manufacture of gas engines, dynamos, motors, converters, transformers, &c. The engineer and architects are Mr. Thomas Rodd, of Pittsburg, U.S.A., and Mr. Charles Heathcote, architect, Manchester. Mr. Charles Heathcote is also architect for the dwellings referred to.

FOREIGN.

FRANCE.—The Municipality of Pau has protested so strongly against the retention at the Louvre of the four tapestries sent from Pau to the exhibition at the Petit Palais, that the Government has felt compelled to give way and restore them. This will probably be a precedent for provincial bodies to make similar protests. It seems quite unreasonable that the Government should endeavour to rob local museums to render the Louvre collection more complete.——A statue of Paul de Kock, of all people, is to be inaugurated at Romainville, a suburb of Paris. In England such a writer would hardly have been thought worth a monument. A statue to a very different order of personage, Victor Considérant, was inaugurated on the 4th inst. at Salins.——A new boulevard maritime, or sea promenade, has been opened at Dieppe.——The municipality of Algiers has under consideration a scheme, presented by M. Redon, for the extension and embellishment of the city.——The jury in the competition for a new covered market at Auxerre, have awarded the first premium to M. Dumé (engineer) and M. Cavé (architect).——M. Foucault, architect to the Third Section of Paris Municipal Architectural Department, has been appointed architect to the central administration, in place of the late M. Ulysse Gravigny.——A large group of school buildings has been completed at Bondy. The architect is M. Ancian, a former student of the Ecole de France at Rome.——M. Camille Lefèvre, the sculptor, has just completed his model for a fine bas-relief in stone intended for the Mairie of Issy-les-Moulineaux. The subject is the Republic crowned by France.——The Government has authorised the execution of the works required for the completion of the new basin at the port of Fécamp. The estimated cost is 625,000 francs.——We have to record the death, at the age of fifty-nine, of M. Georges Dalbin, architect, a former pupil of Hippolyte Lebas and of M. Ginain. He carried out numerous works in domestic architecture, and in 1887 obtained, in collaboration with Carrier-Belleuse, the third premium in the competition for the monument to Lamartine at Macon.——We have to record also the death, at the age of 50, of M. F. Kaheun, architect, and inspector of the Louvre Palace. He was an architect of talent, but chiefly known in private practice.——We have also to announce the death, at Tallard (Hautes Alpes), of the well-known etcher, Eugéne Champollion. He had etched several of the leading pictures of the day for reproduction. He made the illustrations for "Salambô" and for "Daphnis and Chloe," and the etched portraits of Sarah Bernhardt and Chevreul. He died at the age of fifty-three.

AUSTRALIA.—The buildings for the Victorian Gold Jubilee Exhibition, Bendigo, Victoria, have been commenced.——A Roman Catholic church is to be erected at Galong, New South Wales, in accordance with designs by Messrs. Sheerin & Hennessy, architects, of Sydney.——The festivities in connexion with the Royal visit have seriously affected building operations in Sydney and suburbs, but there are now signs of a revival.——A new Central railway station is to be built in Devonshire-street, Sydney.——The design of Mr. J. White, of Sydney, has been accepted for the West Australian Fallen Soldiers' Memorial. The monument will be erected on Mount Eliza, in Perth Park. The selected design shows a granite base surmounted by a group of statuary, depicting an Australian volunteer defending with his bayonet at the "ready" a wounded comrade who is quenching his thirst from a water-bottle. Bronze tablets are to be affixed to the four sides of the base.——To supply water in certain arid districts in New South Wales, the Government has sunk upwards of ninety bore holes. The most expensive one is at Dolgelly, and it cost about 10,600*l.*——Extensive improvements are about to be made in the groundt surrounding the Roman Catholic cathedral as Bendigo.

MISCELLANEOUS.

KING'S COLLEGE, LONDON. — The following is the result of the examinations in the evening department in Architecture and Building Construction in order of Merit: — *Building Construction.*—Silver Medal and 3*l.* in books, Mr. F. J. Jones; Bronze Medal and 2*l.* in books, Mr. G. H. Briggs; 1*l.* in books and Certificate of Distinction, Mr. G. Thompson. Certificate of Distinction, Messrs. P. Luker, J. J. Crowe, P. J. Black, H. F. Berry, W. Fenn, and J. H. H. Ixer; Certificate of Merit, Messrs. H. A. Alexander, F. Davies, J. N. Horsfield, and J. A. Meikle. *Constructional Drawing.*—3*l.* in books and Certificate of Distinction, Mr. W. Nicholls; 2*l.* in books and Certificate of Distinction, Mr. A. J. Meikle; 1*l.* in books and Certificate of Distinction, Mr. E. L. Hampshire; Certificate of Distinction, Messrs. A Gomme, H. H. Ixer, A. Bale, and H. Berry; Certificate of Merit, Messrs. J. J. Crowe, A. E. Bowles, P. J. Black, and G. H. Briggs. *Quantities*—3*l.* in books and Certificate of Distinction, Mr. F. J. Jones; 2*l.* in books and Certificate of Distinction, Mr. F. Davies; 1*l* in books and Certificate of Distinction, Mr. H. Berry; Certificate of Distinction, Messrs. J. Black and J. N. Horsfield; Certificate of Merit, Messrs. F. Hartnoll, H. A. Alexander, and E. L. Frost. *Sanitary Construction.*—(Sir George Faudell Phillips's Medal not awarded.) *History of Architecture.*—Silver Medal and 2*l.* in books, Mr. E. L. Hampshire; Bronze Medal and 1*l.* in books, Mr. A. E. Brooker; Certificate of Distinction and 1*l.* in books, Mr. S. A. Meikle; Certificate of Merit, Messrs. J. A. Gillett, W. Fenn, G. W. Rogers, H. Byron. *Architectural Sketching Class.*—Bronze Medal and 1*l.* in Books, Mr. A. E. Brooker. *Architectural Studio.*—Gold Medal and 3*l.* in books, Mr. E. L. Hampshire; Silver Medal and 2*l.* in books, Mr. A. E. Brooker. *Wood-Carving*—Scholarship for one year and Silver Medal, Mr. R Toms; Scholarship for two terms and Bronze Medal, Mr. H. S. Jones; Scholarship for one term, Mr. M S. Mathers.

"GREAT EASTERN RAILWAY TOURIST GUIDE."—The sixpenny tourist guide to the Continent issued by the Great Eastern Railway Company, is intended as a companion to a holiday trip by their route. It contains a good deal of information, many illustrations, and plans of Brussels and Amsterdam. The general folding map at the beginning has been put in so that it opens upside down, an inconvenience which should be avoided in future issues.

PROPOSED IMPROVEMENTS, HALIFAX.—A Local Government inquiry was held at the Halifax Town Hall recently, before Mr. E. A. Sanford Fawcett, A.M.I.C.E., with respect to an application for powers by the Halifax Corporation to borrow 7,825*l.* for the new police-station, 105,722*l.* for street improvements, 3,719*l.* for gas department, 15,926*l.* for sewerage works, 1,272*l.* for the purchase of a site at Skircoat for the purpose of a refuse destructor, a total of 134,464*l.*

BRICKMAKING IN FORMOSA.—This industry is growing, according to a recent consular report, and in late years the Japanese have encouraged the use of kiln-burnt bricks in place of the sun-dried mud bricks, of which nearly all the one-storied buildings had been erected by the Chinese. The mud bricks are usually made in the vicinity where a building is being erected. The kiln-burnt bricks used by the Japanese are made from clay, which is good and abundant on the island. The material is mixed in a pit consisting of a circular roadway sunk in the ground a half foot or so, around which tramps an ox. Water is added to the sand and clay, and the mixture is trodden by the ox till it reaches the right consistency. As a rule, for the ordinary building brick, three parts sand to seven parts clay are used. The green bricks are formed in suitable wooden moulds operated by hand. An ordinary workman can mould 500 to 800 a day, and some operators, exceptionally expert, run as high as 1,200. These workmen are paid 1 to 1.50 yen (50 to 75 c.) a thousand. The majority of the Japanese factories have well-built, permanent kilns, each with an average monthly capacity of about 100,000 bricks. Formosa coal, at about 4 yen (2 dols.) a ton, is used as fuel. The finished brick is in demand at 7 to 11 yen (3.50 to 5.50 dols.) a thousand. Occasionally there is an order for some special shape or quality, and these bricks will bring as high as 20 yen (10 dols.) a thousand. The chief demand, however, is for a good quality building brick at about 10 yen (5 dols.) a thousand. The labour employed is chiefly Chinese; Japanese are utilised only as overseers, &c. Chinese day labour receives from 30 to 40 sen (15 to 20 c.) and Japanese 30 yen (15 dols.) a month and upward. At present there are twelve large, permanent factories owned or controlled by Japanese, with a total monthly production of about 2,500,000 bricks. In addition, there are forty or fifty native factories producing brick, roofing, and floor tiles. Among the largest firms are the Samejima Shokai (head office, Daitotei, North Formosa), with factories at Kentan, Daichokuho, Hokuseiko, Sharyo, and Borvo, North Formosa.—*Engineering and Mining Journal, New York.*

PLUMBERS' REGISTRATION BILL.—In the House of Lords on the 30th ult., Lord Glenesk, in moving the second reading of this Bill, said the object was to establish a system under which plumbers can, if they please, be registered. No privilege was given to a registered workman, but he could not call or represent himself to be a registered plumber unless he was so registered under the Bill. The main object of the measure was similar to the Bills read a second time in 1892 and 1897 and examined by committees in those years. He thought the Bill would be acceptable to their lordships, as it was approved by the opinion of the public.—Lord Kenyon said no doubt the object aimed at was to register plumbers so as to make them as efficient as they could be made. As the Bill now stood it cast on the Local Government Board the formation of a scheme which that Board did not want to undertake. If the promotors of the Bill would prepare a scheme and make it part of the Bill, then it could be introduced next year in a complete form. He had no objection to the Bill being read a second time.—The Bill was read a second time.

PUBLIC IMPROVEMENTS, BLACKPOOL.—On behalf of the Local Government Board, Colonel A. G. Durnford held an inquiry at Blackpool recently into an application made by the Corporation for sanction to borrow 2,690*l.* for works of sewerage, and 2,232*l.* for the formation of so much of a proposed new road from Marton Green to New House Farm as will be within the borough, including the sewering of the same.

THE MANCHESTER SHIP CANAL.—The Canal Company have obtained powers of compulsory purchase of the ground belonging to the Manchester Racecourse Company. The latter sent in a claim for one million sterling, but the result of the arbitration was that Mr. Robert Vigers, the arbitrator, awarded the sum of 262,500*l.* as the price to be paid by the Canal Company for the property. The decision of the Court of Chancery has been upheld by the Court of Appeal. The Act giving the Company power to take the Racecourse provides that possession must not be taken until the end of this year without the consent of the Racecourse Company, and they will not be ready to vacate the property before that date. The report of the engineer to the Canal Company (Mr. W. H. Hunter) states that the depth of water in the canal and docks has been maintained throughout, although it is to be regretted that, comparing one year with another, no diminution whatever of the quantities of sludge and detritus carried down and deposited in the canal and docks has been experienced. The spare steel gates for the 65 ft. locks have been completed and are now being worked in place of the intermediate gates at Barton Locks, which are under repair. The erection of the new offices at Trafford-road has proceeded; the offices are approaching completion, while those at the end of No. 4 dock have been completed and are in use for traffic purposes. Considerable progress has been made with the dock and railway extension works authorised by the Act of 1900. The western portion of the through line of railway has been completed, and a length of the main road on the northerly boundary of the company's property has also been completed and is in use. A portion of the permanent fencing and gates has been erected, the levelling of the portion of the ground purchased from Captain Clowes, which is to be employed for storage purposes, has been completed and is being brought into use. Additional railways and service roads are in course of construction. The embankments and slopes of the canal generally are in good condition.

AUSTRALIAN TIMBER AND TIMBER-GETTING.—The timber resources of the Australian Parent State, although largely wasted in the past, are yet of a most extensive character, and under a proper system of conservation would become as valuable as any in the world. In a report by the Queensland Inspector of Forests, descriptive of a visit to New South Wales, that official states that on the Murray River, dividing New South Wales from Victoria, are situated the far-famed Murray River gum forests, the area of forests extending a distance of about 200 miles on the frontage of that river, but with occasional breaks, and running back from the river on an average of from one to six miles. New South Wales has an area of about 140,000 acres reserved for this timber, most of this country being liable to floods and densely timbered with gum, from the matured tree to the sapling and small plant. As showing the extent of the timber trade in the district, it may be mentioned that during the season December, 1900, and April, 1901, the quantity of timber obtained was 5,593 logs, containing an average of 1,150 superficial feet per log, equal to 6,431,950 ft. of timber, on which royalty is payable of 4,047*l.* 0s. 5d., at 1s. 3d. per 100 superficial feet. The greater portion of this timber was cut on behalf of a Victorian company, and is stacked in depots on the higher banks of the Murray River, pending a rise of water, when it is removed by pontoons and punts, towed by small steamers to Echuca (Victoria), where it is cut into sleepers, mining timbers, and for bridge and building purposes.

THE HOUSES OF PARLIAMENT.—In the House of Commons, on the 5th inst., on the vote to complete the sum of 38,000*l.* for the Houses of Parliament buildings, Mr. Dillon said he did not want luxury of any kind in the House of Commons, but he thought they were entitled to have the conditions under which they had to live there made as little insanitary and deadly as possible. They heard a great deal of insanitary dwellings, but the House of Commons was as insanitary a dwelling as they could find anywhere except in the very purlieus of the city. He was informed by the Kitchen Committee, too, that the accommodation provided for the servants would be a disgrace to any private house. He would be glad to hear from the First Commissioner of Works a statement as to the steps he proposed to take to improve the ventilation and increase the accommodation in the House.—Mr. O'Mara said he joined in the representations of his friend as to the lack of proper accommodation for members and for the servants of the House.—Mr. W. Redmond agreed that the arrangements made for the accommodation of members of the House were very defective, and hoped the recommendations of the Committee would be carried into effect as quickly as possible.—Mr. Akers-Douglas agreed that the accommodation for members was very defective. There was dining accommodation only for 140 members, yet one night recently as many as 300 members had to obtain their dinners in the building. The accommodation in the smoking-room was equally deficient, and in the winter months it was often impossible to obtain a seat after waiting for hours. He was very anxious to see these things remedied, but it was even more necessary to improve the apartments in which officials of the House worked. The conditions under which the telegraph operators worked was a scandal. There was a strong feeling in the House that too much was done for guests and not enough for working members of the House. When the existing accommodation was provided it was not intended that members should give dinners for fourteen or sixteen people constantly during the Session and crowd out those who wished to use the House for business purposes. He would endeavour to see whether that particular portion of the Report which related to the proper provision for the working members and officials of the House could be undertaken this year.—Mr. Malcolm called the attention of the First Commissioner of Works to the want of ventilation in the Committee-rooms.—Mr. Dillon said the state of the Committee-rooms was perfectly poisonous.—The vote was agreed to.

LEGAL.

ZOARS *V.* HARBROW.

THIS was an action for breach of contract originally tried before Judge French at the County Court, and referred by the King's Bench to the City of London Court. It came before Mr. Pitt Lewis, K.C., Deputy Judge. Mr. Holloway was for the plaintiff, and Mr. Deney for the defendant.

The latter, finding that he had underestimated the work, declined to proceed, giving as his reason that the structure was a special one under Section 82 of the London Building Act.

Mr. H. Lovegrove, District Surveyor, gave evidence and his reasons for allowing the tank to be encased, and his view was also taken by Mr. Edward Power, District Surveyor. The defendant called Mr. A. W. Tanner and Mr. H. Parsons.

The Judge decided that the work in question came under Section 61, and not under 82, and ordered the defendant to pay the difference between the amount of his tender and that of Messrs. Mattock, who eventually carried out the work, with costs of the previous trials.

PLUMBERS AND OVERTIME.

AT the Westminster Police-court, on the 31st ult., Messrs. Trollope, builders and contractors, of Grosvenor-road, S.W., were summoned, before Mr. Francis, by John Randall, a plumber in their employment, who sought to recover 1*l.* 4s. 1d., claimed to be due for overtime.

Mr. W. M. Thompson supported the summons, and Mr. Duckworth appeared on behalf of the defendants.

The complainant said he was sent to the City to do certain work at the office of a stockbroker. Owing to the noise a complaint was made, and he had to do the work at night. Prior to commencing he had some conversation with the defendants' foreman as to terms, and said he should expect to be paid in accordance with the rates laid down in the book of rules generally adopted by plumbers. This laid it down that overtime commenced at eight o'clock, and carried time and a half up to eleven o'clock, and double from then until seven in the morning. He had not been paid at these rates. His contention was that he was entitled to overtime rates, even if he did not work at all during the day.

Mr. Duckworth said this was the only point at issue.

Mr. Francis (looking at the book of rules handed up) said he noticed that one of the rules set forth that in the event of there being any dispute between employer and employee arising out of the rules, the matter should be decided by a board of conciliation, whose decision should be final. The whole thing rested on the interpretation of the rules. Provision had been made for disputes being referred to a certain tribunal. Had that course been adopted?

Mr. Thompson said the book of rules had no statutory effect, and did not hold good in a court of law. It had not yet been shown that the com-

plainant had consented to be bound by the rules produced.

Mr. Francis: But his whole contention is that he is entitled to so much by these rules. I shall adjourn the case *sine die*.

Mr. Thompson: Do I understand that your worship declines jurisdiction?

Mr. Francis: I do. This man founded his case on this book of rules.

Mr. Thompson submitted that the rules had nothing to do with the case. The court took no notice of the tribunal mentioned in the book of rules. His worship was asked to adjudicate in a claim under the Employers and Workmen Act.

Mr. Francis: I may be wrong, but I shall adjourn the case *sine die*. You must take what course you deem proper.

His worship was prepared to state a case for a superior court.—*Morning Advertiser.*

CASE UNDER THE LONDON BUILDING ACT.

AT Westminster Police-court recently, William Rose Pickard, of City-road, E.C., was summoned by the London County Council for contravening Section 63 of the London Building Act, 1894.—Mr. Chilvers, who supported the summons, said the defendant was the builder of St. James's Court, Buckingham-gate—very lofty mansions—and he had permitted them to be occupied without having obtained a certificate from the Central Authority, showing that they were provided with the necessary means of escape for the residents in case of fire. Plans were sent to the Council last August, added Mr. Chilvers, but no alternative means of escape was furnished apart from the usual entrance and exit, and they were not considered satisfactory. In spite of this the buildings were occupied. Mr. Francis imposed fines of 4*l.* and 4*l.* 4s. costs.

SHEFFIELD BUILDING BY-LAWS CASE.

THE Stipendiary (Mr. E. M. E. Welby) gave judgment at the Sheffield Police-court on the 30th ult. in the case in which the Sheffield Corporation charged Thomas Nuttall, of Slinn-street, Walkley, with certain breaches of the building by-laws. The point was whether certain old tramcars which defendant had bought and erected on a piece of land at the corner of South-road and Highton-street, Walkley, were new buildings within the meaning of the by-laws. Four summonses were taken out against the defendant, one of which—charging him with neglecting to give notice to the City Surveyor of intention to erect—was dismissed by the Stipendiary on the first hearing of the case. The other charges had reference to the roof and walls of the "buildings," and defendant's failure to construct them of incombustible material, as provided by the by-laws.

The Stipendiary, in giving judgment, said the puzzle was to know whether two old tramcars had become new buildings, within the meaning of the by-laws; secondly, whether they had become domestic buildings; and if they had, and were not within the exemptions—which they appeared not to be—all their external walls ought to be constructed in accordance with the rules given in By-law No. 17. The complaint made was that the external walls had not been so constructed. As to whether or not the cars had become new buildings there had been several cases decided by the Queen's Bench Division of the High Court, which more or less bore upon the question, and of these Richardson (appellant) against Brown (respondent), decided in February, 1885, and the combined cases of the Mayor of Southend-on-Sea (appellant) against Archer (respondent) and Romani (respondent), seemed most to bear on it. The case of Richardson against Brown appeared nearer to fit the circumstances of the two tramcars, and as the article in question in that case was held to be a new building, he held these two cars to have become new buildings within the meaning of the by-law. If the Southend-on-Sea case had seemed nearer, he should have held that they had not become new buildings, because the articles expressed in that case were held not to be. As to whether the two tramcars had become two new "domestic" buildings, it appeared that one of them was going to be used as a meat shop if all had gone well, but the other car would have been a warehouse for oilcloth and linoleum. He held that neither of them had actually become "domestic" buildings within the meaning of the by-laws. Although he held that there had been an infringement of the other by-law, the offences committed, owing to the great obscurity in the term "new building," were so trifling, that it was inexpedient to inflict more than a nominal punishment, and so the order would be to pay 2s. and costs on each of the two summonses upon which conviction was made.

LANCASHIRE BUILDING DISPUTE.

THE case of Rowson *v.* Harrison came before the Court of Appeal, composed of Lords Justices Vaughan Williams and Stirling, on the 6th inst., on the appeal of the defendant from an order of Mr. Justice Bucknill at the Manchester Assizes on the 24th ult. referring the case for trial before an official referee if the parties could not agree on a special referee.

Mr. Mallinson, in support of the appeal, said that the writ in the action was issued on October 18 last year. The statement of claim was delivered on December 14 last. On January 21 an order was made by consent that the case should be tried by a jury. The plaintiff did not seem to be in a hurry to get the case before a jury, because it was not until the present Manchester Assizes that the case came on for trial. The list at the assizes was a very long one, and there were sixty-two cases for trial. The case came on for trial before Mr. Justice Bucknill and a jury, and in the result his Lordship said he should refer the case, and did so refer it. The defendant now appealed from this order, and said it was eminently a case for a jury to try, and that the learned judge had no jurisdiction to refer the case, and even if he had jurisdiction he had exercised his discretion wrongly. The plaintiff's claim was for damages for alleged obstruction of light and damage to his house in the course of some rebuilding. The claim for light was on a certain agreement, and the plaintiff further said that the defendant, in making alterations to his house, damaged his (the plaintiff's) house. The defence was that the defendant built under a builder and architect nominated by the plaintiff, that the plaintiff had the plans and specifications, and, so far as the light was concerned, the plaintiff consented to everything, and so far as the damage was concerned, the defendant pleaded a denial. The claim for the damage principally rested, not on negligent building, but on trespass in underpinning. The learned counsel contended that it was a proper case to be tried by a judge and a jury, and if the jury had a view of the *locus in quo*, there would be absolutely no difficulty in it. The case could not last a long time.

Mr. Hudson, for the respondent on the appeal, contended that it was a proper case to be tried before an official referee.

At the conclusion of the arguments Lord Justice Vaughan Williams in giving judgment said there was nothing on the face of the proceedings which suggested that the case involved a long inquiry. He thought in the circumstances that it was a proper case for trial before a judge and jury.

Lord Justice Stirling concurred, and the appeal was accordingly allowed, and the order of the learned judge in the court below set aside.

CASE UNDER THE LONDON BUILDING ACT, 1894.

LONDON COUNTY COUNCIL *v.* GARDINER: BAD MORTAR.

AT the Woolwich Police-court, on the 26th ult., before Mr. d'Eyncourt, Frederick Gardiner, 21, Bostall Hill, Plumstead, appeared to answer an adjourned summons by the London County Council for not putting together the brickwork of a building in Grosmount-road with mortar composed in accordance with the Council's by-laws. He was also summoned for neglecting to comply with the notice of the District Surveyor to remedy such irregularity.

The London County Council were represented by Mr. Andrews, while Mr. Tyrrell appeared for the defence.

At the outset it was explained that the case had been adjourned in order that fresh samples from other parts of the building might be taken and analysed.

The District Surveyor, Mr. Thomas Batterbury, submitted diagrams showing the positions from which he took samples.

Cross-examined by Mr. Tyrrell, Mr. Batterbury said nothing appeared to be wrong with the house, and, with the exception of the mortar, the house was properly constructed.

By Mr. d'Eyncourt: The case had been taken up because the mortar in its present state would be affected by the damp and crumble away.

Re-cross-examined: The District Surveyor said he could not say how long the house would last.

Mr. Grimwood, before whom the samples had been placed, produced the result of his analysis, showing the respective proportions of lime and sand in the mortar, and said that the general result of the analysis of the further samples was that they were more or less earthy, and that, in fact, none of the samples were in accordance with the by-laws.

Re-examined: Mr. Grimwood frequently received samples from other districts to analyse. The earthy matter in one of the specimens was 9 per cent., and it should not exceed 1½ per cent.

For the defence, Mr. Stevens, architect and surveyor, of Walthamstow, said he was of opinion that the mortar had set well, was hard, and perfectly good enough for the work. It was quite suitable for speculative building generally.

Mr. d'Eyncourt: In speculative building is the very best mortar used?

Witness: I don't say so.

Mr. d'Eyncourt: Do you say the second best?

Witness: I won't say that.

Mr. d'Eyncourt: Or the third best?

Witness: Nor the third best. He knew of a building at Clapham Junction built with similar mortar which, to his knowledge, had lasted twenty-three years, and was still in good condition.

Mr. d'Eyncourt said the question he had to consider was the condition of the mortar. He was loth to make an order to demolish the building until he was thoroughly satisfied that the building was bad throughout. There had been brought before them the definition of speculative building of such a type that the London County Council was anxious to forbid. He convicted the defendant on the summons under the by-laws in respect of the improper mortar, and fined him 1*l.* and ordered 2*l.* 2s. for costs. On the summons for failing to comply with the notice of irregularity, he made an order on the defendant within fourteen days to take down the brickwork put together with the improper mortar, and ordered the defendant to pay 5*l.* 5s. for costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

6,403.—A SPARK-ARRESTER: *A. J. Wilton.*—A wider conical cap is put upon the top of the chimney-pipe, and around it is placed a hopper (having a flange turned inwards at its rim) fitted with spiral vanes and joined with tubes to a discharging-pipe.

6,414.—DOOR-BOLTS: *F. J. Cope.*—A pin passed through a semi-circular slot joins the bolt-tail to the knob which may be turned for readily working the bolt, but cannot be forced backwards; the pin may be provided with a roller, and, in another shape, the bolt is connected with a lever upon the spindle of the knob.

6,455.—ROOFING AND OTHER SLABS: *L. Hatschek.*—The slabs are composed of an artificial stone which consists of a mixture of asbestos, or some other fibrous substance, hydraulic lime, and cement, of which thin plates are formed in a cardboard-making machine, the plates being then subjected to a high pressure for their shapes and surfaces.

6,458.—A SPANNER: *A. R. Upward.*—A plate that can be turned and fixed to the handle has several jaws or openings cut around it, its squared stem will fit between jaws upon the handle, and a pin inserted through a flange upon the stem and into the handle locks the plate, or the plate may be locked by means of a bolt.

6,464.—A COMBINED CHIMNEY COWL AND VENTILATOR: *R. M. Pancaost.*—A set of outer plates is hung from a top cover so as to cover openings into a space above the neck of the cowl; overlapping inner plates are arranged between the vertical edges of the outer plates, and in some cases the several plates are flared or curved; the contrivance is available for a continuous series of skylight ventilators affixed to a roof.

6,497.—A FITTING FOR LAVATORY BASINS: *G. Smith.*—The inventor's object is to furnish means of obtaining a supply of water when the main pipe is not available for that purpose. He provides an auxiliary tank at the back, with a tap that projects over the basin.

6,524.—A WALL-TIE: *F. D. Johnston.*—The wall-tie or plate is fashioned of open-work sheet-metal, in a double V-shape on plan, with ears at the sides, middle webs, and pierced lugs or ears at the ends, which are to be nailed in position or turned up at a right angle so as to enter joints in the brickwork.

6,536.—A CHIMNEY POT: *F. Marchant.*—Vertical wind-passages are fashioned in the chimney-pot, which communicate upwards with inlet openings, and have fans fitted upon their bell-mouths. The spindles of the fans carry vanes outside the passages.

6,576.—A JOINT OR STOP FOR TUBES: *C. W. Schou.*—The joint is devised for tubes and tube terminals, and also for stopping tube ends. A collar of soft metal or alloy, to be cut into and displaced as the joint is being screwed up, is fitted either upon an interior screwed liner or ferrule, or upon the screw which is threaded in the tube bore, the liner being screwed internally. The joint is specified as being adapted for tee-pieces, for screw plugs, and for closing sockets.

6,595.—THATCHING OF ROOFS: *R. W. Spurway.*—After the straw has been pressed between perforated plates (which are disposed parallel-wise) with an end-rammer, it is made secure with wire pins between galvanised wires or waterproofed strings, to the ends of which rings are firstly fastened, the pins being inserted through the holes in the pressing-plates. For providing a continuous length of straw matting, the wires or strings are unwound from rollers. The ends of the pressing-plates have guide-notches that take the wires.

6,620.—CALLIPER GAUGES: *E. Capitaine.*—The two legs are made in two parts, so that a sliding gauge may be approximately set to the measurement required. When the parts have been clamped together, the calliper points are finely adjusted with a screw that operates upon the vernier arm against the pressure of a spring. In the case of large work, the two legs may be pivoted on to clamps upon a cross-bar, and the ends of one leg and the vernier arm are joined in the same manner, whilst a nut and a right-and-left-handed screw serve to shorten and lengthen the cross-bar.

6,625.—MANUFACTURE OF GAS: *G. Ottermann & Co. and V. Loos.*—A fire-clay retort, which has a stirring-blade, and is heated to from 700 deg. to 800 deg. C., is charged with waste products, refuse sweepings, &c. The resultant gases are conveyed into a second fire-clay retort similarly heated, and

being dissociated as they pass over red-hot paper ashes, or some other neutral material, and over heated coke, are passed through a container which is charged with a red-hot admixture of carbon and alkali carbonates, or an admixture of potash, carbon, and ground iron or iron oxides, so that the nitrogen becomes retained as cyanogen compounds. The combustible gases are then conveyed (out of the second retort) to a hydraulic main, and so to condenser. It is stated that they are practically free from carbonic oxide.

6,706.—A METHOD OF HEATING BUILDINGS: *A. G. Paul.*—The invention, which is more particularly applicable for the system of heating specified in No. 21,423 of 1891, furnishes thermostatical means for automatically regulating the supply of the heating fluid and for working a valve in the air-exhaust pipe or in an air-flue; it embodies various modified forms, by one of which a thermometer, clipped on to one of the radiator pipes, provides for the closing of the supply pipe when the electrical circuit is effected and an armature is attracted by a coil in opposition to a spring. In another form it is arranged that the thermometer shall, by means of an electro-magnet, regulate a valve in the air-pipe, an exhauster, in the shape of a jet of steam or water being affixed to the end of the pipe; or an electro-magnet which attracts an armature is set to operate a damper that will admit cold air to cool the radiator as soon as a certain temperature has been attained and electrical current has been made.

6,737.—FENCES AND FENCING: *N. B. Riddle.*—The post has its lower portion made of glass in concavo-convex shape and its upper portion of wood, the two parts being fastened together with bolts, and cushions are inserted between them, and springs between the bolt-nuts and the lower part of the post; the cushions are intended to prevent the upper part from becoming decayed, as they allow air to circulate around, and the springs will minimise the effects of shocks upon the glass arising from strain upon the wire runners.

6,739.—A METHOD OF BALANCING WINDOWS: *W. Schuch and G. Wolf.*—A groove in each sash-stile carries a screw having a rapid pitch between dove-tailed bearing plates and working in a U-shaped threaded sleeve. A screwed plug secures one end of the upper pivoted plate to the screw, whilst to the other end is secured a coiled spring. To the top and bottom rails of the sash are fixed recessed plates in which the bearing or pivot plates will slide. Lubricating oil runs from a cup upon the upper pivot down inside a hollow screw, and so through the pierced plug and lower pivot; in a variant shape screws are rotated by threaded sleeves or nuts which are secured to the sashes so as to wind up the springs as the sashes are being lowered. The lower end of the screw is joined with a screwed coupling-rod to the spring-rod carried by a conical bearing block. Its upper end is mounted upon a fixed slotted bearing plate, and to an adjustable sleeve, of which the ratchet teeth will engage with the teeth of the bearing block is secured the lower end of the spring.

6,745.—A CHART FOR PLOTTING REGULAR FIGURES.—*I. M. B. Thompson.*—The inventor has devised a mathematical chart wherewith regular figures and patterns may be plotted; from a common centre he describes a series of equidistant circles, and for setting out the angle-points of regular polygons he draws radial lines inclined from a common starting-point at the angles desired; the lines end upon different circles; those, for instance, for the pentagon, decagon, and so on upon the first circle, those for the square, octagon, and so on upon the second circle, and they are numbered at their outer ends 20, 5, 20, 10, 20, 5, ... , 4, 32, 16, 32, 8, 32, 4 . . . . . The circles are marked with the numbers of the sides of the polygons to which they severally appertain, and with the letters *a*, *b*, *c*, ... *s*; the space outside the remotest circle is divided into squares with their diagonals marked; the sides of the squares are equal to the distances between the pairs of adjacent circles; tangents to the circles, lines at right angles intersecting at given points, and other lines may be drawn by means of the squares and their diagonals, and measuring scales are marked around the entire diagram.

6,793.—AUTOMATICAL SWITCHING APPARATUS (ELECTRICAL): *F. J. Tolchard.*—The voltmeter will close the one or the other of two relay circuits when the current varies from the limits determined; motors that will work a switch for cutting in or out battery cells are connected with the relays; a series of switch arms which carry contacts that dip into mercury cups is engaged by a series of discs having recesses set in a helical curve and mounted upon a shaft; rollers of the arms repose upon the discs, so that one switch only can be "on" at one time; the contacts, which are connected through a resistance, are shaped so that the main circuit cannot be completely broken, nor a cell be short-circuited; the motors at either end of the switchboard have, apiece, an electro-magnet with an armature that will turn a shaft; on the armature shaft is a rod which, as it engages the ends of a horn, will break the motor-circuit when the movement of the armature is completed and one cell has been cut in or out.

6,819.—AN INSTRUMENT FOR SURVEYORS' USE: *M. Baumer.*—The instrument is adapted for measuring distances and horizontal or vertical angles, or the co-ordinates of distant points, and for plotting them on paper. A disc fitted with a vernier moving over a scale upon another disc affixed to the column is approximately adjusted with an arm fitted with a set-screw, for the finer adjustment a tangent screw is set in engagement with a pin that projects from a bracket upon the former disc, to which are fastened the bearings of the horizontal axis and a bracket; the bracket carries a worm which works a sector upon the axis and is fitted with a scale and a vernier. A foot to which the distance meter is secured is clamped by V-grooves cut in a plate mounted on arms upon the shaft, and its two telescopes are set at a fixed distance the one from the other. The horizontal vernier having been adjusted at zero the fixed telescope is fixed upon the distant object, and as the other telescope is then directed on to the object its distance may be ascertained from the vernier reading; the height of the object and its horizontal distance are then read by the adjustment of a vertical rod that slides upon a horizontal scale attached to the disc with a scale upon the shaft, a pencil-point upon a slide at the bottom of the vertical rod plots upon a drawing-board each point as it is surveyed.

MEETINGS.

WEDNESDAY, AUGUST 14.

Institute of Sanitary Engineers.—Examination and Literary Committee at 3.0 p.m. General Purposes and Finance Committee at 4.0 p.m. Council Meeting at 7.0 p.m.

AUGUST 12 TO 17.

Institution of Junior Engineers.—Summer Meeting, Plymouth and Devonport. Visits to H.M. Dockyard, Devonport; H.M.S. *Cambridge* (gunnery ship) and H.M.S. *Defiance* (torpedo school ship); Keyham Dockyard Extension Works; Keyham Steam Yard and Royal Naval Engineering College; Royal William Victualling Yard; Saltash Tubular Bridge; and other works and places of engineering interest in the neighbourhood. The Summer Dinner of the Institution takes place at the Hotel Continental, Plymouth, on Friday, August 16.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 16.—By ED. PARTRIDGE (at Bideford).

Shebbear, Devon.—Caute and Trickey's Farm, 85 a. 0 r. 22 p., f. £1,650

By WINCH & SONS (at Ashford).

Biddenden, Kent.—River Hall Estate, 129 a. 0 r. 24 p., f. 2,430
Bethersden, Kent.—Bridge Farm, 64 a. 3 r. 18 p., f. 850
Jack Watts' Field, 18 a. 1 r. 28 p., f. 250
Enclosures of land, 27 a. 2 r. 1 p., f. 410
The Bull Green Land, 26 a. 3 r. 17 p., f. 740
Toll Gate House, 0 a. 1 r. 5 p., f. 165
Freehold house and four cottages 505

July 23.—By ALFRED RICHARDS (at Tottenham).

Tottenham.—Lordship-rd., a block of building land, with stabling thereon, f. 565

July 25.—By WALTON & LEE (at Whitby).

Lealholm, Yorks.—Lealholm Bridge Farm, 211 a. 1 r. 35 p., f. 4,750

By WINCH & SONS (at Maidstone).

Headcorn, Kent.—Brookwood Farm, 141 a. 3 r. 8 p., f 3,000
Frittenden, Kent.—Little Hungerden or Hungerdown Farm, 39 a. 0 r. 37 p., f. 1,000
Staplehurst, Kent.—Bower Fields, 10 a. 2 r., 26 p., f. 550

By COOPER & PREECE (at Ross).

Sellack, &c., Hereford.—Baysham Court Estate, 245 a. 2 r. 6 p., f. 9,700
Two Acres at the Marsh, 2 a. 2 r. 23 p., f. 105

By DAVID PRICE (at Hay).

Brilley, Hereford.—Kintley Farm, 231 a. 1 r. 6 p., f. 6,500

July 26.—By S. & G. KINGSTON (at Long Sutton).

Long Sutton, Lincs.—Freehold messuage and 2 a. 3 r. 7 p. 355
Various enclosures of land, 24 a. 1 r. 29 p., f. .. 1,008
Enclosures of land, 11 a. 0 r. 9 p., f. 700
Six cottages and several gardens, 2 a. 0 r. 9 p., f. 323
Little Sutton, Lincs.—Two enclosures, 10 a. 2 r. 0 p., f. 530
Freehold messuage and 24 a. 2 r. 5 p. 1,490

By VERNON & SON (at High Wycombe).

Chepping Wycombe, Bucks.—Three enclosures, 24 a. 1 r. 36 p., f. 600
Holmer Green, Bucks.—A cottage and 3 a. 0 r. 31 p., f. 360
Polydores and 2a. 2 r. 36 p., f. 430
Two cottages and 3 a. 2 r. 16 p., f. 410
Piece of woodland, &c., 11 a. 3 r. 11 p., f. 290
Little Missenden, Bucks.—Piece of meadow land, 2 a. 0 r. 33 p., f. 145
Freehold cottages and 7 a. 1 r. 29 p. 260
Enclosures of land, 18 a. 2 r. 11 p., f. 730
Hyde Heath Farm, 70 a. 2 r. 25 p., f. 1,675
Hedgerley, Bucks.—A freehold residence and 4 a. 3 r. 20 p. 676
Woburn Common, Bucks.—Enclosure of land, 10 a. 2 r. 2 p., f. 440

By DOLMAN & PEARCE.

Hampstead.—6 and 8, Pond-st., f., r. 95*l.* 1,155
Stoke Newington.—64, Mildmay-pk., f. 1,110
Holloway.—68, Cottenham-rd., u.t. 62 yrs., g.r. 6*l.* 6s., r. 36*l.* 305

By KNIGHT, FRANK, & RUTLEY.

Soho.—11, Dean-st., f., r. 115*l.* 2,800
Putney.—27 and 29, High-st., f., r. 180*l.* 4,000
Brixton.—42, Lorn-rd., u.t. 33 yrs., g.r. 2*l.*, r. 45*l.* 400
105, Holland-rd. and 181, Loughborough-rd., u.t. 93 yrs., g.r. 20*l.*, r. 170*l.* 800
184, Brixton Hill, also Guyatts Yard and l.g.r. 15*l.*, u.t. 13 yrs., g.r. 51*l.*, r. 108*l.* 690

By HARDS & BRADLY.

Greenwich.—44 and 46, Haddo-st., u.t. 96 yrs., g.r. 8*l.* £400
Charlton, Kent.—108, Charlton-lane, u.t. 85 yrs., g.r. 4*l.* 12s. 285
Greenwich Market Tolls.—The tolls, rents, and stallages, together with No. 1, Weighing-room, let at per annum 200

By OGDEN, SONS, & OLLEY.

Wimbledon.—44, 46, and 50, Russell-rd., f. 1,100

By RIDER & SONS.

Notting Hill.—243 to 261 (odd) and 251A and 251B, Latimer-rd., u.t. 42 yrs., g.r. 142*l.*, r. 416*l.* .. 1,090
1 to 5, Wood-st., u.t. 63½ yrs., g.r. nil. 1,260
13 and 15, Bangor-st., u.t. 65 yrs., g.r. 7*l.* 520
14 and 16, Bangor-st., u.t. 64 yrs., g.r. 10*l.* 15s. 600
108, 110, and 112, Walmer-rd., u.t. 41 yrs., g.r. 21*l.* 800
Kensal Rise.—10, Earlsmead-rd., u.t. 82 yrs, g.r. 5*l.* 245

By VICTOR VAUGHAN.

Finchley.—36, Hertford-rd., f., r. 36*l.* 600

July 27.—By S. & G. KINGSTON (at Wisbech).

Sutton St. Edmonds, Lincs.—Inkerson Fen Farm, 77 a. 3 r. 37 p., f. 2,500

By MORRIS, SONS, & PEARD (at Taunton).

Trull, &c., Somerset.—Batts Park Estate, 37 a. 0 r. 15 p., f. 4,925
Haygrove and Batts Farm, 159 a. 3 r. 14 p., f... 6,875
Wilton, &c., Somerset.—Cutliffe and Cotlake Farm, 185 a. 2 r. 37 p., f. 6,900
Trull, Somerset.—Comeytrowe Farm, 115 a. 1 r., f. 4,675
Pitminster, Somerset.—Howleigh Farm, 178 a. 3 r. 30 p., f. 5,300
Lower Blagdon Farm, 9 acres, f. 700
Angersleigh, &c., Somerset.—Leigh and Wrexon Farm, 269 a. 0 r. 25 p., f. 4,050
Corfe, Somerset.—Whitford Quarry, and 16 a. 3 r. 39 p., f. 300
Kittisford, Somerset.—Kittisford Barton Estate, 267 a. 2 r. 10 p., f. 5,000
New House Farm, 151 a. 3 r. 37 p., f. 3,525
Winsford, Somerset.—High and Lower Tor Farm, 196 a. 0 r. 32 p., f. 1,460

July 29.—By BAXTER, PAYNE, & LEPPER.

Bickley, Kent.—Park Riding, and 1 a., f. 3,300
Beckenham, Kent.—1, 2, and 3, St. Margaret's-rd., u.t. 98½ yrs., g.r. 10*l.* 17s. 6d. 760

By ELLIOTT, SON, & BOYTON.

Kensington.—68, Holland-pk., f. 4,450

By FURBER, PRICE, & FURBER.

Chancery-lane.—15, Took's-court, area 1,200 ft., f. 1,620

By FOSTER & CRANFIELD.

Ealing.—2, Oxford-rd., u.t. 61½ yrs., g.r. 7*l.*, r. 34*l.* 220
Marylebone.—100, Crawford-st., u.t. 5½ yrs., g.r. 12*l.*, r. 85*l.* 225

By MOORE & TEMPLE.

Hackney.—1, 3, 5, and 7, Chatham-pl., u.t. 38 yrs., g.r. 21*l.* 10s., r. 127*l.* 950
72, Paragon-rd., u.t. 38 yrs., g.r. 4*l.*, r. 34*l.* 290
115 and 117, Eleanor-rd., u.t. 56½ yrs., g.r. 10*l.*, r. 66*l.* 660

By W. R. NICHOLAS & CO.

Orpington, Kent.—Glentworth and nearly 3 a., f. 3,000

By REYNOLDS & EASON.

Poplar.—High-st., The Queen's Palace of Varieties, f.g.r. 45*l.*, reversion in 12 yrs. 3,600
Whitechapel.—54, Mansell-st., f., r. 55*l.* 1,700
Hoxton.—Hyde-rd., &c., i.g.r.'s 153*l.* 16s., u.t. 15½ yrs., g.r. 51*l.* 16s. 770
Hyde-rd., &c., i.g.r. 45*l.* 10s., u.t. 17½ yrs., g.r. 17*l.* 10s. 200
Whitmore-rd., &c., i.g.r.'s 210*l.* 4s., u.t. 15½ yrs., g.r. 136*l.* 4s. 1,070
Finsbury.—4, 6, 10, 12, 14, and 16, Clifton-st., u.t. 7½ yrs., g.r. 47*l.*, r. 184*l.* 16s. 325
Old Kent-rd.—No. 390 to 398 (even); also 1 and 2, Ormond-passage; and 1, 2, aud 3, Glengall-cottages, u.t. 26 yrs., g.r. 17*l.* 15s. 1,750
Kingsland.—20, Mansfield-st., u.t. 18 yrs., g.r. nil, r. 26*l.* 175

July 30.—By H. J. BROMLEY.

Norwood.—143 and 145, High-st., u.t. 22½ yrs., g.r. 16*l.* 250
Catford.—66 and 68, Bradgate-rd., f., r. 48*l.* 665
Brockley.—79, Foxberry-rd., u.t. 73 yrs., g.r. nil., r. 52*l.* 800

By DEBENHAM, TEWSON, & CO.

Godalming, Surrey.—Ockford-rd., Ockford House and 2 a., f. 2,750

By DENNANT & CO.

Wilmington, Kent.—Wilmington Hall and 48 a. 3 r. 12 p., f. 5,140

By MULLETT, BOOKER, & CO.

Hyde Park.—Southwick-cres., i.g.r. 20*l.*, u.t. 33½ yrs., g.r. 2*l.* 295
Southwick-pl., i.g.r. 20*l.*, u.t. 33½ yrs., g.r. 2*l.* 10s. 285

By RAMSEY & CO.

Peckham.—2, Lanvanor-rd., u.t. 75½ yrs., g.r. 5*l.* 320

By WALTER SIMONDS.

Clapham.—54, Fentiman-rd., u.t. 24 yrs., g.r. 6*l.* 10s., e.r. 48*l.* 310

By FRED. VARLEY.

Finsbury Park.—5, Adolphus-rd., u.t. 73 yrs., g.r. 9*l.* 13s., e.r. 65*l.* 485
16, Princess-rd., u.t. 63 yrs., g.r. 12*l.* 12s., e.r. 65*l.* 625
Stoke Newington.—42, Milton-rd., f., r. 26*l.* 405
Dalston.—79, Forest-rd., u.t. 13½ yrs., g.r. 3*l.* 10s., r. 30*l.* 115

By FRED. WARMAN.

Gray's Inn-rd.—7, Calthorpe-st., u.t. 18 yrs., g.r. 9*l.* 10s., r. 60*l.* 420
Islington.—39 to 44, Wilton-sq., u.t. 23½ yrs., g.r. 25*l.* 4s., r. 192*l.* 1,300
Holloway.—31, Upper Tollington-rd., u.t. 41½ yrs., g.r. 6*l.* 10s., e.r. 42*l.* 310
Crouch End.—29, Crescent-rd., u.t. 67 yrs., g.r. 10*l.* 600
Hornsey.—Grove House-rd., a range of stabling, f., e.r. 28*l.* 245

By HAMPTON & SONS.

Wimbledon.—Pepys-rd., a freehold cottage 550
Cottenham Park-rd., f.g.r.'s 117*l.*, reversion in 57½ yrs. 2,930
The Drive, f.g.r.'s 127*l.*, reversions in 76, 77, and 84 yrs. 3,160
Arterberry-rd., f.g.r.'s 131*l.*, reversions from 77 to 83 yrs. 3,215
Arterberry-rd., a freehold site, r. 50*l.* 1,230

Wimbledon.—Worple-rd., f.g.r.'s 35*l.* reversions in 69, 88, and 98 yrs. £910
Pepys-rd. (near), two freehold plots 200
New Southgate.—Bowes-rd., Devanha House, f. 2,390
Fleet, Hants.—Peatmoor and 4 a., f. 3,500
Reigate, Surrey.—Greenhayes and ⅜ a., f. 2,500

By J. C. PLATT (at Hammersmith).

Hammersmith.—Ravenscourt-sq., Ravenstower, u.t. 36½ yrs., g.r. 8*l.*, e.r. 65*l.* 650
Kensington.—15, Colet-gardens, u.t. 90 yrs., g.r. 7*l.* 10s., e.r. 48*l.* 590

By M. C. INNOCENT (at Lechlade).

Bradwell, Oxon.—Peacock Farm, 68 a. 3 r. 14 p., f., subject to payment of 11s. per week to life aged 43 1,100

By D. LEGGE, SON, & PEARCE (at Dursley.)

Cam., Glos.—Ashmead Estate, 72 a. 3 r. 32 p., f. 5,600
Lower Leaze Close, 11 a. 0 r. 9 p., f. 830
Coaley, Glos.—Field Farm, 114 a. 1 r. 28 p., f. .. 4,950
Stinchcombe, Glos.—Melksham Court Farm, 144 a. 1 r. 37 p., f. 3,800
Bownance Wood, 10 a. 1 r. 33 p., f. 510
Various closes of land, 57 a. 3 r. 37 p., f. 2,510
Newnham Quarry Farm, 19 a. 1 r. 35 p., f. 810
Cam, Glosr.—The Old Quarry, 1 a. 2 r. 18 p., f. .. 325

July 31.—By ARTHUR BLACKFORD.

Wandsworth.—23, 25, and 27, Frogmore, f. 675
38 to 43, Wharf-rd., f. 1,015

By BROAD, WILTSHIRE, & PENNY.

Southwark.—1, 2, and 3, Little Suffolk-st., u.t. 20½ yrs., g.r. 18*l.* 350

By BUNCH & DUKE.

Hackney.—33, Casterton-st., u.t. 76 yrs., g.r. 6*l.*. 250

By COOPER & GOULDING.

Barnsbury.—Hemingford-rd., i.g.r.'s. 40*l.*, u.t. 41 yrs., g.r. 4*l.* 615
Clapton.—Jeffreys-rd., &c., i.g.r.'s 89*l.*, u.t. 59 yrs., g.r. 25*l.* 1,090
Forest Hill.—Wynell-rd., i.g.r. 15*l.*, u.t. 62 yrs., g.r. 2*l.* 240
Kennington.—Kennington-grove, Prince of Wales Tavern, i.g.r. 30*l.*, u.t. 23¼ yrs., g.r. 14*l.* 10s.. 175

By GIDDY & GIDDY.

Whitton, Middx.—Hounslow-rd., Argyle Lodge and 3½ a., f. 2,000

By FRANK JOLLY & Co.

Finsbury.—21, Cross-st., u.t. 16½ yrs., g.r. 58*l.*, r. 38*l.* 3s. 2,260

By NEWBON, EDWARDS, & SHEPHARD.

Highgate.—49, Cromwell-av., f., e.r. 75*l.* 1,050
Stoke Newington.—14, St. Kilda's-rd., u.t. 73½ yrs., g.r. 7*l.*, r. 38*l.* 445
Crouch End.—4, Aubrey-rd., u.t. 86½ yrs., g.r. 9*l.*, e.r. 50*l.* 485
Highbury.—59, Leigh-rd., u.t. 58 yrs, g.r. 10*l.*, e.r. 65*l.* 550
Islington.—6 and 8, Arlington-st., u.t. 26 yrs., g.r. 8*l.* 8s., r. 62*l.* 520
Dalston.—111, Pownall-rd., u.t. 42 yrs., g.r. 4*l.*, r. 26*l.* 300
Penge.—23, Woodbine-gr., f., r. 22*l.* 305

By RUSHWORTH & STEVENS.

Bayswater.—26, Northumberland-pl., u.t. 44½ yrs., g.r. 6*l.* 6s., r. 43*l.* 370

By WEATHERALL & GREEN.

Fleet-st.—Nos. 86, 87, and 88, corner building site, area 1,050 ft., f. 15,500
Leicester-sq.—10, Leicester-pl., and 40A, Lisle-st., beneficial lease for 20 yrs., r. 200*l.* until 1911 and 225*l.* thereafter 600
Wimbledon.—1, 3, and 5, Hartfield-rd., f., r. 190*l.* 4,100
Tilbury, Essex.—Broadway, a corner building plot, f. 220

By WESTON & SONS.

Kennington.—86 and 88, St. Mark's-rd., f. 600
151, Warham-st., f. 445
136, Farmers-rd., f. 200
Peckham.—52, Hill-st., f., r. 39*l.* 410

By STIMSON & SONS.

Enfield.—Browning-rd., a freehold building estate, 3 a. 1,230
Kensington.—12, Campden Hill-sq., u.t. 35 yrs., g.r. 7*l.*, r. 130*l.* 650
Deptford.—Adolphus-st., The Lord Stanley b.-h., f., r. 60*l.* 1,270
69, Adolphus-st., f., r. 25*l.* 310
3, Mitchell-cottages, f., r. 20*l.* 210
Brixton.—41, Beechdale-rd., u.t. 89 yrs., g.r. 10*l.*, r. 50*l.* 580

August 1.—By ORGILL, MARKS, & LAWRENCE.

Haymarket.—Coventry-st., The Globe Restaurant, also, 5, Rupert-st., f. 40,000
5, Coventry-st., beneficial lease for 76½ yrs., r. 325*l.* 2,500
6 and 6A., Coventry-st., and 1, Rupert-st., a profit rental of 385*l.* for 10 yrs. 1,000

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—46, St. Kilda's-rd., u.t. 78 yrs., g.r. 10*l.* 10s., e.r. 60*l.* 700
1, Foulden-rd., u.t. 71 yrs., g.r. 7*l.*, e.r. 55*l.* 500

By GLASIER & SONS.

Pimlico.—54, Belgrave-rd., u.t. 28 yrs., g.r. 14*l.*, r. 130*l.* 1,100
Belgravia.—1, Halkin-st., u.t. 23½ yrs., g.r. 5*l.*, r. 240*l.* 450
Barnsbury.—Hemingford-rd., i.g.r.'s 56*l.*, u.t. 41 yrs., g.r. 8*l.* 830

By STIMSON & SONS.

Peckham.—331, 233, 235, 237, 241, and 243, Hollydale-rd., u.t. 71 yrs., g.r. 25*l.* 13s. 4d., r. 200*l.* 1,510
112 and 114, Camden-grove, u.t. 63 yrs., g.r. 8*l.*, r. 54*l.* 460
Battersea.—11 and 12, Lubeck-st., u.t. 56 yrs., g.r. 8*l.*, r. 54*l.* 370
11, Shillington-st., u.t. 68 yrs., g.r. 4*l.* 10s., r. 26*l.* 150
22 to 28 (even), Wayford-st., u.t. 74 yrs., g.r. 20*l.*, r. 155*l.* 835
63 and 65, Wayford-st., u.t. 56 yrs., g.r. 9*l.* 6s. 8d., r. 67*l.* 425
Wandsworth.—35 to 43 (odd), Garton-st., u.t. 52 yrs., g.r. 15*l.* 15s. 310
44 and 46, Wardley-st., u.t. 79 yrs., g.r. 6*l.* 6s. . 135
Battersea.—2 to 14 (even), Carpenter-st., u.t. 70 yrs., g.r. 29*l.* 10s. 1,010
39, Rowena-cresc., u.t. 76 yrs., g.r. 5*l.* 230
Tooting.—25 and 27, Albert-ter., u.t. 76 yrs., gr. 6*l.* 310
Mitcham.—39 to 55 (odd), Fountain-rd., u.t. 79 yrs., g.r. 24*l.* 15s. 460
Sutton.—12 to 18, 42 to 72 (even), 23 to 29 (odd), Beulah-rd., u.t. 77 yrs., g.r. 87*l.* £2,290
Croydon.—80, 82, and 84, Southbridge-rd., u.t. 79 yrs., g.r. 18*l.* 600
Beckenham.—95 and 97, Mackenzie-rd., u.t. 83 yrs., g.r. 9*l.* 430
Molesey.—Kent-rd., Chester Lodge, u.t. 66 yrs., g.r. 12*l.* 10s., r. 60*l.* 400
Bethnal Green.—1, 2, and 3, Peacock-pl., and 1 to 15, Peacock-st., u.t. 76 yrs., g.r. 77*l.* 1,590
Silvertown.—2 to 52 (even), Emma-st., u.t. 76 yrs., g.r. 104*l.* 2,045
Victoria Docks.—1 to 9 (odd), Stanley-st., u.t. 66 yrs., g.r. 20*l.* 410
West Ham.—88 and 90, Meeson-rd., u.t. 78 yrs., g.r. 10*l.* 340
Stamford Hill.—1 to 15 (odd), Netherton-rd., u.t. 75 yrs., g.r. 32*l.* 980

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.			
Hard Stocks	1 14 0	per 1,000	alongside, in river	
Rough Stocks and Grizzles	1 11 0	,,	,,	,,
Facing Stocks	2 12 0	,,	,,	,,
Shippers	2 8 0	,,	,,	,,
Flettons	1 8 6	,,	at railway depôt.	
Red Wire Cuts	1 14 6	,,	,,	,,
Best Fareham Red	3 11 0	,,	,,	,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,,	,,
Best Blue Pressed Staffordshire	4 4 6	,,	,,	,,
Do., Bullnose	4 9 0	,,	,,	,,
Best Stourbridge Fire Bricks	4 2 6	,,	,,	,,
GLAZED BRICKS				
Best White and Ivory Glazed Stretchers	13 0 0	,,	,,	,,
Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	17 0 0	,,	,,	,,
Double Stretchers	19 0 0	,,	,,	,,
Double Headers	16 0 0	,,	,,	,,
One Side and two Ends	19 0 0	,,	,,	,,
Two Sides and one End	20 0 0	,,	,,	,,
Splays, Chamfered, Squints	20 0 0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,	,,
Double Stretchers	15 0 0	,,	,,	,,
Double Headers	14 0 0	,,	,,	,,
One Side and two Ends	15 0 0	,,	,,	,,
Two Sides and one End	15 0 0	,,	,,	,,
Splays, Chamfered, Squints	14 0 0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.	

	s. d.	
Thames and Pit Sand	7 3	per yard, delivered.
Thames Ballast	6 0	,, ,,
Best Portland Cement	34 6	per ton, delivered.
Best Ground Blue Lias Lime	25 6	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 28s. od. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt	
Bath ,,	1 7	,,	,,
Farleigh Down Bath	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,,	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale in blocks	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York in blocks	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt	
,, ,, 6 in. Rubbed Ditto	3 0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 2 in. self-faced Ditto	0 9½	,,	,,
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt.	
,, ,, ,, 6-in sawn both sides landings	2 7	per ft. super. deld. rly. depôt.	
,, ,, ,, 3-in. do.	1 2½	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep	
,, best seconds ,,	10 15 0	,,	,,
16× 8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc	10 18 0	,,	,,
16× 8 best blue Portmadoc	6 0 0	,,	,,
20×10 best Eureka unfading green	11 2 6	,,	,,
16× 8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green	10 0 0	,,	,,
16× 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.			
Best plain red roofing tiles	41 6	per 1,000	at rly. depôt.	
Hip and valley tiles	3 7	per doz.	,,	,,
Best Broseley tiles	48 6	per 1,000	,,	,,
Hip and valley tiles	4 0	per doz.	,,	,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,,	,,
Do. ornamental Do.	60 0	,,	,,	,,
Hip tiles	4 0	per doz.	,,	,,
Valley tiles	3 9	,,	,,	,,
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000	,,	,,
Hip tiles	4 1	per doz.	,,	,,
Valley tiles	3 8	,,	,,	,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 10 0	16 10 0	
Deals: best 3 by 9	13 10 0	14 10 0	
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11 0 0	12 0 0	
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals seconds	1 0 0	less than best	
Battens: seconds	0 10 0	,, ,, ,,	
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	10 10 0	
2 in. by 4½ in. and 2 in. by 5 in.	9 0 0	10 0 0	
Foreign Sawn Boards— 1 in. by 1½ in. by 1½ in.	0 10 0	more than battens.	
¾ in.	1 0 0	more than battens.	
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Swedish balks	2 15 0	3 0 0	
Pitch pine timber (35 ft. average)	3 0 0	3 10 0	

JOINERS' WOOD.

	At per standard. £ s. d.	£ s. d.	
White Sea: First yellow deals, 3 in. by 11 in.	25 0 0	26 0 0	
3 in. by 9 in.	22 0 0	23 0 0	
Battens, 2½ in. and 3 in. by 7 in.	19 0 0	20 0 0	
Second yellow deals, 3 in. by 11 in.	20 0 0	21 0 0	
,, ,, 3 in. by 9 in.	19 0 0	20 0 0	
Battens, 2½ in. and 3 in. by 7 in.	15 0 0	16 0 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	15 0 0	16 0 0	
Battens, 2½ in. and 3 in. by 7 in.	12 0 0	12 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.	22 0 0	23 0 0	
Do. 3 in. by 9 in.	19 0 0	20 0 0	
Battens	14 10 0	15 10 0	
Second yellow deals, 3 in. by 11 in.	16 10 0	17 10 0	
Do. 3 in. by 9 in.	15 0 0	16 0 0	
Battens	12 0 0	12 10 0	
Third yellow deals, 3 in. by 11 in.	13 10 0	14 10 0	
Do. 3 in. by 9 in.	13 0 0	13 10 0	
Battens	11 10 0	12 0 0	
White Sea and Petersburg:— First white deals, 3 in. by 11 in.	15 0 0	16 0 0	
,, ,, 3 in. by 9 in.	14 0 0	15 0 0	
Battens	12 0 0	13 0 0	
Second white deals 3 in. by 11 in.	14 0 0	15 0 0	
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0	
,, ,, battens	10 10 0	11 10 0	
Pitch pine: deals	16 0 0	18 0 0	
Under 2 in. thick extra	0 10 0	1 0 0	
Yellow Pine— First, regular sizes	30 0 0	33 0 0	
Broads (12 in. and up)	2 0 0	more.	
Oddments	22 0 0	24 0 0	
Seconds, regular sizes	24 10 0	26 10 0	
Yellow Pine Oddments	20 0 0	22 0 0	
Kauri Pine— Planks, per ft. cube	0 3 6	0 4 6	
Danzig and Stettin Oak Logs— Large, per ft. cube	0 2 6	0 3 0	
Small ,, ,,	0 2 3	0 2 6	
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 7	
in. do. do.	0 0 7	- - -	
Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11	
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0	
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0	
Teak, per load	16 0 0	20 0 0	
American Whitewood Planks— Per ft. cube	0 3 0	0 3 6	

Prepared Flooring—	Per square	
1 in. by 6 in. and 7 in. yellow, planed and shot	0 13 0	0 16 6
1 in. by 6 in. and 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 6 in. and 7 in. yellow, planed and matched	0 16 0	1 1 0
1 in. by 6 in. and 7 in. white, planed and shot	0 11 0	0 13 0
1 in. by 6 in. and 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 6 in. and 7 in. white, planed and matched	0 14 0	0 16 6

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	8 0 0
Compound Girders ,, ,,	9 0 0	10 5 0
Angles, Tees and Channels, ordinary sections	8 17 6	10 17 6
Flitch Plates	9 0 0	9 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 5 0	9 0 0

[*See also page 147.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Alteration to Ecclesall Church	Sheffield		Aug. 31
Laying out grounds for Western Parade	Penzance		Sept. 1
Laying out land to be added to Cemetery	Blackpool	30*l.*, 15*l.* and 5*l.*	Sept. 16
Public Baths	Chelsea		Oct. 1
Public Baths and Washhouses	Camberwell	150*l.*, 75*l.* and 50*l.*	Oct. 29
Chapel, not to exceed 5,000*l.*	Cardiff		No date
Municipal Buildings, Fire Station, Surveyor's Residence	Walton-on-Thames		do.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to School and House, Maindy	Llandaff School Board	G. E. Halliday, Architect, 14, High-street, Cardiff	Aug. 13
Cottages at the Asylum, Burghill	Hereford Asylum Committee	A. Dryland, Surveyor, Shire Hall, Hereford	do.
Additions to Station, Great Marlow	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Six Houses, Westhoughton, Lancs.	United Industrial Society, Ltd.	A. E. Suddell, Architect, Church-street, Westhoughton	do.
Laying Cast-iron Pipes (3 miles)	Newport (Mon.) Corporation	E. T. Hildred, Civil Engineer, Town Hall, Newport	do.
Road Works, Reddish-road Tramway	Stockport Corporation	J. Atkinson, Civil Engineer, Town Hall, Stockport	do.
Houses, Wortley Cemetery, Leeds	New Wortley Burial Board	J. W. Lawton, Architect, 86, Albion-street, Leeds	do.
Cemetery Building Works	Romsey Burial Committee	J. Jenvey, Architect, Romsey	do.
Rebuilding Bridge over the Thames	Standing Joint Committee	J. Morris & Son, Architects, 156, Friar-street, Reading	do.
Police Station, Walkden, near Bolton	Whitehaven R.D.C.	H. Littler, Architect, County Offices, Preston	Aug. 14
Bridge, Crossdale, Ennerdale	St. Germans R.D.C.	G. Boyd, Civil Engineer, 33, Queen-street, Whitehaven	do.
Water Supply, St. Stephen's-by-Saltash		F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Church Works, Lisbellaw, Ireland	Stamford Town Council	Mr. Downey, Fermanagh Library, Lisbellaw	do.
Road Works, Northfields Estate	Burnley Corporation	J. Richardson, Surveyor, 15, Barn-hill, Stamford	do.
Widening Mitre Bridge	Kettering U.D.C.	Borough Surveyor, Town Hall, Burnley	do.
Sewers, Lias-street, &c.		T. R. Smith, Surveyor, Market Place, Kettering	do.
Pair Cottages, Hall Farm, Purleigh	S. & T. Trounson	F. Whitmore, Architect, 17, Duke-street, Chelmsford	Aug. 15
Offices and Stores, Redruth		S. Hill, Architect, Green-lane, Redruth	do.
Additions to Highfield House, near Huddersfield		J. Kirk & Sons, Architects, Huddersfield	do.
Stabling, &c., Outlane, near Huddersfield	Miss Earle	J. Berry, Architect, 9, Queen-street, Huddersfield	do.
Shop and House, Fore-street, Redruth	Messrs. S. & T. Trounson	S. Hill, Architect, Green-lane, Redruth	do.
Offices and Stores, Redruth	Eastbourne Town Council	do.	do.
Road, The Decoy		R. M. Gloyne, Civil Engineer, Town Hall, Eastbourne	do.
Farmhouse, Aish, South Brent		W. T. Pearse, Surveyor, Modbury, Devon	do.
Additions to Methodist Church, Whitehaven		A. Huddart, Architect, 22, Lowther-street, Whitehaven	do.
Rebuilding Bridge, Worleston, near Nantwich		H. F. Bull, The Castle, Chester	do.
Farm Buildings, &c., Chittlehamholt, N. Devon	Mr. W. R. Moore	S. Dobell, Architect, Queen-street Chambers, Exeter	Aug. 16
Additions to Gortuakelly House, near Enniskillen		T. Elliott, 37, Darling-street, Enniskillen	do.
Additions to School, Spittal		W. Gray, Architect, 2, Ivy-place, Berwick-on-Tweed	do.
Residence, Stable, &c., Ingleton, near Kendal		S. Shaw, Architect, Highgate, Kendal	do.
Five Houses, Hogg's Folly, Londonderry		E. J. Toye, Architect, Strand, Londonderry	do.
Wrot-iron Fencing with Gates, &c.	Rev. Dr. O'Doherty	Borough Engineer, Town Hall, Hackney, N.E.	do.
Stables, Cottage, &c., Crutchfield-lane	Met. Borough of Hackney	G. J. Jenkin, Civil Engineer, Council Offices, Walton	Aug. 17
Rebuilding Three Horseshoes Inn, Wroughton, Wilts.	Walton-on-Thames U.D.C.	W. Drew & Sons, Architects, 28, Regent-circus, Swindon	do.
Additions to Homes, Rothwell, Haigh		W. E. Richardson, Architect, Rothwell	do
Gymnasium, Neath	Hunslet Guardians	D. M. Jenkins, Architect, Gwyn Hall, Neath	do.
Addition to and Renovation of Liberal & Radical Club	County School Governors	The Secretary, 213A, Barking-road, E.	do.
Granite Kerbs and Channels	The Committee	Surveyor, Public Offices, Grassendale, W. Liverpool	do
Mission Room, Hyde, Brimscombe, Glos.	Garston (Lancs.) U.D.C.	G. P. Milnes, Architect, Town Hall Offices, Stroud	Aug. 19
School Buildings, near Cardiff		R. & S. Williams, Architects, Wharton-street, Cardiff	do.
Blocks of Conveniences, &c., Holywell Green	Whitchurch School Board	W. C. Williams, Architect, 29, Southgate, Halifax	do.
House, West Didsbury, Lancs		J. Cartwright, Market Place, Bury	do.
School	Whitchurch School Board	R. & S. Williams, Architects, Wharton-street, Cardiff	do.
Alterations, &c., to Sanitary Arrangements at Wkhouse	Strand Union	A. A. Kekwick, Architect, 18, Outer-temple, Strand	Aug. 20
Addition to Bakehouse, Bethnal Green	London County Council	Architect's Department, 18, Pall Mall East	do.
Disinfecting Station, Feeder-road	Bristol Corporation	T. H. Yabbicom, Civil Engineer, 63, Queen-square, Bristol	do.
Electricity Works	Batley Corporation	J. C. Barraclough, Engineer, Market Place, Batley	Aug. 21
Cabmen's Shelter, &c.	Rochester Corporation	W. Banks, Civil Engineer, Guildhall, Rochester	do
Pavilion at Hospital, Aughton	West Lancashire R.D.C.	Rawcliffe & Seward, Architects, Fishergate, Preston	Aug. 22
Erection of Dwellings, Rotherhithe	London County Council	Architect's Department, 18, Pall Mall East	Aug. 23
Mortuary, Livingstone-street	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	Aug. 27
Sewer and Works in connexion	Winsford U.D.C.	Surveyor to Council, Market Place, Winsford	do.
Seaside Homes, Rustington, near Littlehampton	Metropolitan Asylums Board	Rowland Plumbe, Architect, 13, Fitzroy-square, W.	Aug. 28
Alterations, &c., to Laundry, Leavesden Asylum	do.	Newman & Newman, Architects, 31, Tooley-street, S.E.	do.
External Staircase at Workhouse, Fulham-road	St. George's Union	E. F. Hall, Architect, 54, Bedford-square, W.C.	do.
Additions to Asylum, Denbigh	The N. Wales Counties Lunatic Asy.	T. M. Lockwood & Sons, Architects, Chester	Aug. 30
Extensions of the Borough Asylum, Middlesbrough	Middlesbrough Corporation	The Clerk, Municipal Buildings, Middlesbrough	Sept. 2
Junior Mixed School, Enfield Lock	Enfield School Board	G. E. T. Lawrence, Architect, 22, Buckingham-street, W.C.	Sept. 3
Additional Outfall Sewers at Crossness	London County Council	Engineer's Department, County Hall, Spring Gardens, S.W	Oct. 8
Vicarage House, Horningsham	Gillingham & Grange U.D. Sch. Bd.	H. F. Price, Architect, Weston-Super-Mare	No date
Board School for 1,250 Children	The Committee	H. D. Pearson, Architect, 27, Chancery-lane, W.C.	do.
Enlargement St. Cuthbert's Church, Thetford		Arthur J. Lacey, 6, Upper King-street, Norwich	do.
New Bridge over Thames at Whitchurch	Mr. J. E. Lyne	J. Morris & Sons, 156 Friar-street, Reading	do.
Additions to No. 8, George-street, Hull	Malton (Yorks) Gas Co.	Freeman & Co., Architects, Carr-lane, Hull	do.
Buildings at Gasworks	Trustees of the Earl of Wilton	H. Tobey, Engineer, Gas Offices, Malton	do.
Additions, &c., to Houses and Shops, Radcliffe	Mr. J. Storrar	J. Sellers & Son, Architects, Union Chambers, Bury, Lancs.	do.
Additions to Premises, Chester	Downham Market Gas Co.	J. H. Davies & Sons, Architects, Newgate-street, Chester	do.
House at Gasworks		Jarvis & Son, King's Lynn	do.
Pair Cottages, Worplesdon, near Woking		G. Howard, Prey Heath, Worplesdon	do.
Additions, &c., to Hotel, Rugby		J. T. Franklin, Architect, 40, Bridget-street, Rugby	do.

[See also next page.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
Railway Surveyors	Western African Railway	30*l.* to 70*l.* per month	At once.
Mains Superintendent	Hastings	150*l.*	Aug. 13
Lecturer in Mechanical Engineering	Preston Technical School	150*l.*	Aug. 14
Assistant in Engineer's Office	Birmingham, Tame, and Rea D.B.	130*l.*	Aug. 15
Surveyor	Bridgewater	225*l.*	Aug. 17
Resident Electrical Engineer and Manager	Finchley U.D.C.	300*l.*	Aug. 19
Inspector of Nuisances	Newton Abbott	150*l.*	do.
General Manager	London Pacific Cable Board	.....	do.
Electrical Engineer	Bedford Borough	350*l.*	Aug. 20
Works Manager	Swansea Corporation	.....	Aug. 24
Instructor in Smith's Work	West Ham Technical Institute	.....	Aug. 30
Instructor in Foundry Work	do.	.....	do.
Professor of Engineering	Bristol University College	.....	Aug. 31
Building Inspector	Maidens and Coombe U.D.C.	120*l.*	Sept. 1
Shift Engineer	Battersea Borough	104*l.*	Sept. 3
Chief Engineer	London County Council	2,000*l.*	do.
Borough Surveyor	Fulham Borough Council	400*l.* per annum	Sept. 4
Electrical Engineer	Cape Colony	500*l.*	Oct. 10
City Engineer and Surveyor	Cape Town	1,500*l.*	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. —.* *Contracts, pp.* lv. vi. viii. x. & xxi. *Public Appointments, pp.* xix. & xxi.

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	9 0 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 15 0
" galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	16 10 0	- - -
" " 22 g. and 24 g.	17 0 0	- - -
" " 26 g.	18 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 5 0	- - -
" " 22 g. and 24 g	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 10 0	10 0 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 17 6	- - -
Pipe in coils	15 7 6	- - -
Soil Pipe	17 7 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	24 10 0	- - -
Silesian	24 0 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 0½	- - -
Thin "	0 1 2	- - -
Copper nails "	0 1 2	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin " "	0 1 1	- - -
TIN—English Ingots "	0 1 5	- - -
SOLDER—Plumbers' "	0 0 7	- - -
Tinmen's "	0 0 8	- - -
Blowpipe "	0 0 9	- - -

PLASTER, &c.

	s. d.	
Coarse Plaster	30 0	per ton delivered.
Fine "	38 0	" "
Coarse Keenes and Parian cement	51 6	" "
Fine do. do.	59 6	" "
Robinson's Fireproof Cement	51 6	" "
Do. Finishing "	56 6	" "
(Exclusive of the ordinary charge for sacks.		
Whiting	30 0	" "

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	3d. per ft. delivered.
" " fourths	2¾d. " "
21 oz. thirds	3¾d. " "
" " fourths	3¾d. " "
26 oz. thirds	5d. " "
" " fourths	4½d. " "
32 oz. thirds	6d. " "
" " fourths	5½d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4½d. " "
¼ Hartley's Rolled Plate	3d. " "
⅜ " " "	3½d. " "
½ " "	4d. " "

PRICES CURRENT (*Continued*).

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 10
" " " in barrels "	0 2 11
" " " in drums "	0 3 1
Boiled " " in pipes "	0 3 0
" " " in barrels "	0 3 1
" " " in drums "	0 3 3
Turpentine, in barrels "	0 2 4
" in drums "	0 2 6
Genuine Ground English White Lead per ton	23 0 0
Red Lead, Dry "	23 10 0
Best Linseed Oil Putty per cwt.	0 9 0
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

A. W. B.—G. R. (Amounts should have been stated).

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDEEN.—For new wing to complete extension of Blairs Catholic College, near Aberdeen. Mr. R. G. Wilson, architect, Aberdeen:—

Masonry.—Jas. King.
Joinery.—Jno. Henderson.
Slating.—Forbes Morrison.
Plastering.—Bannochie & Sons.
Plumbing.—Thorn & Strachan.
Painting.—Edward Copeland.
[All of Aberdeen.]

Schedules by architect. Total of accepted tenders, about £12,000.

BODMIN.—For additions, &c., to county asylum buildings to accommodate 400 patients, for the Cornwall County Council. Mr. Silvanus Trevail, architect, Truro, and Palace-chambers, Westminster. Quantities supplied:—

Wakeham Bros.	£121,087	Krauss & Sons	£92,335
Shillitoe & Son	111,176	A. H. Coles	92,105
King & Sons	102,700	Wilkins & Sons	90,850
C. Brealy	101,856	W. E. Blake	90,193
Thos. Rowbotham	101,500	S. Trehane	88,795
H. E. Skinner	99,156	Pethick Bros., Plymouth*	87,973
Willcock & Co.	94,300		
Patrick & Co.	94,009		

BRIDLINGTON.—For the execution of sewerage works, for the Town Council. Mr. E. R. Matthews, C.E., Town Hall, Bridlington. Quantities by engineer:—

G. W. C. Pearson, Hull* £7,771 18 4

BUCKINGHAM.—For the execution of water-supply works, Charndon and Twyford, for the Rural District Council of Buckingham. Mr. G. Roberts, engineer, Deanshanger, Stony Stratford:—

Gravitation Scheme.
Village 1½ miles away 40 ft. below Reservoir site.

E. & H. Roberts, Limited, Deanshanger Ironworks £901 3 4

Charndon Scheme.

E. & H. Roberts, Limited, Deanshanger Ironworks 627 14

CANTERBURY.—For alterations, &c., to old museum, Guildhall-street, for the Corporation. Mr. A. C. Turley, C.E., Tudor Chambers, Canterbury:—

W. J. Adcock	£783 11 2	C. Mount, Canterbury*	£564 10 0
Gann & Co.	630 0 0		

[City Surveyor's estimate, £650.]

CHAILEY (Sussex).—For the erection of hospital, house, &c., for the Rural District Council. Mr. H. Card, engineer, 10, North-street, Lewes. Quantities by Mr. H. Curtis Card, F.S.I.:—

H. Young	£4,998	Norman & Burt	4,498
J. Finch	4,899	W. Wells	4,474
Cook & Son	4,813	Peerless, Dennis & Co., Eastbourne*	4,244
Box & Turner	4,620		
Turnbill & Co.	4,600		

CHRISTCHURCH (Hants).—For the re-construction of Mews bridge. Mr. W. J. Taylor, surveyor, the Castle, Winchester:—

A. Thorne	£447	T. Tiller	£330
Jenkins & Sons	387	F. Osman, Sonthampton*	297

CLEETHORPES (Lincs.)—For the erection of stable, granary, &c., Poplar-road, for the Cleethorpes-with-Thurnscoe Urban District Council. Mr. Egbert Rushton, C.E., Poplar-road, Cleethorpes:—

	Stables, &c.	Roller House.
Waterman	£816 0 0	£259 13 9
C. Lewis	760 0 0	240 0 0
Wade, Limited, Cleethorpes*	712 6 6	193 4 0
Surveyors' estimate	698 0 0	180 0 0

COWDENBEATH (N.B.).—For the execution of drainage works for the Police Commissioners. Messrs. Buchanan & Bennett, C.E., 12, Hill-street, Edinburgh:—

Harvie & Co.	£3,602 14 5	John Martin	£2,719 0 5
Nimmo & Coupar	3,047 14 0	Mackay & Son	2,662 11 4
Henderson & Duncan	2,949 3 7	W. Isbister	2,466 10 0
R. Brebner	2,838 10 0	W. Caragher	2,394 17 2
D. & J. Stratton	2,814 16 10	D. Gilmour	2,067 15 8
		James Kirk	1,859 12 0

[*See also next page.*

DEWSBURY.—For the erection of four houses, &c., Thornhill-road, for the Pioneers' Industrial Society, Limited. Messrs. Holtom & Fox, architects, Corporation-street, Dewsbury:—

Masonry.—G. Broadbent, Ravensthorpe*	£678 4 11
Joinery—T. B. Bailey, West Town, Dewsbury*	229 0 0
Plumbing.—J. Stead, Batley-Carr*	50 0 0
Plastering.—A. & F. Hodgson, 14, Wilans-road, Dewsbury*	76 10 0
Slating.—W. H. Thompson, Batley*	44 10 0
Painting.—S. Oldroyd, Dewsbury*	14 5 0

ERITH (Kent).—For the execution of private street works, Grosvenor-road, &c., for the Urban District Council. Mr. A. W. Jennings, Surveyor, Council Offices, High-street, Erith. Quantities by Surveyor:—

Wilson, Buder, & Co.	£2,716 1 5	H. C. Soan	£2,159 13 6
T. Adams	2,498 3 0	W. H. Wheeler	2,050 8 6
Fry Bros.	2,453 14 2	Lawrence & Thacker	2,009 8 8
Free & Sons	2,166 0 0	R. Ballard, Child's Hill*	1,987 0 0
Woodham & Sons	2,164 4 0		

[Surveyor's estimate, £2,207 5s. 5d.]

HERTFORD.—For sewer works. Mr. J. H. Jevons, Borough and Waterworks Engineer and Surveyor:—

Meston & Hale	£1,251	Wallace & Inns (corrected tender)	£1,756
G. F. Tomlinson	1,136	A. C. Soan (corrected tender)	1,110
J. Jackson	1,102		
G. Porter	1,090		
A. T. Catley, London*	1,086		

LITTLEHAMPTON.—For the construction of reservoir, house, cottage, &c., Batworth Park. Mr. H. Howard, Engineer, Town Offices, Littlehampton. Quantities by Mr. C. F. A. Poland, John-street, Bedford-row, W.C.:—

Linfield & Son	£8,975 0	W. Wallis	£7,989 0
A. Burrell	8,366 10	A. E. Nunn, Tenterden, Kent*	7,863 2
Snewin Bros.	8,327 0		
Peerless, Dennis, & Co.	8,149 0		

[Engineer's estimate, £8,030.]

LONDON.—For Tollington School, Tetherdown, Muswell Hill. Mr. Alfred Conder, architect, Palace-chambers, Westminster:—

W. Akers & Co.	£2,255	T. D. Steed & Son*	£2,100

Subject to certain omissions.

NENAGH (Ireland).—For the erection of business premises, Castle-street, and St. Peter's-street, for Messrs. Hodgins & Co. and F. Day. Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork. Quantities by Mr. William Butler, Dublin:—

Thomas Williams	£3,281	J. Burke, Venagh, co. Tipperary	£2,740
Cullen Bros.	3,233		
Lisk & Sons	3,138		

NORWICH.—For extensive additions to the city asylum, Hellesden. Mr. A. E. Collins, C.E., Guildhall, Norwich:—

Coulson & Loft	£6,257 1 4	John Hurn	£5,792 0 0
Downing & Son	6,238 0 0	Chapman & Son	5,342 0 0
G. E. Hawes	5,958 0 0	H. C. Greengrass, Norwich*	5,206 16 3
Youngs & Son	5,957 0 0		
J. S. Smith	5,813 10 0		

[City Engineer's estimate, £5,525 17s. 1d.]

PATELEY BRIDGE (Yorks).—For the erection of minister's house, for the Primitive Methodist Trustees. Mr. Amos Chippindale, architect, Harrogate:—
David Lauson, Pateley Bridge £450

STOKE-UPON-TRENT.—For the erection of three shops and warehouse, High-street, for Mr. J. H. Irwin. Messrs. R. Scrivener & Sons, architects, Hanley, Staffs.:—

Brain & Smith	£3,597 0 0	J. Bagnall	£3,210 0 0
R. E. James	3,447 12 2	Meiklejohn & Son, Stoke-on-Trent*	3,100 0 0
Tompkinson & Bettelley	3,305 0 0		

WATFORD.—For additions, &c., to Watford Field (girls') School for the School Board. Mr. C. P. Ayres, architect, Burvale, Watford. Quantities by architect:—

General Builders Co.	£3,497	C. Brightman	£3,115
A. E. Wilson, Ltd.	3,358	R. L. Tonge	3,025
G. Wiggs	3,312	Clifford & Gough, Watford‡	2,943
H. B. Watkins	3,227		
G. & J. Waterman	3,225		

‡ Accepted subject to the approval of the Board of Education.

WOODFORD (Essex).—For repairs, repainting, and cleansing works in connexion with the Churchfield Schools, Woodford. Mr. Edward Tidman, C.E., Architect to the Board, Connaught Mansions, Westminster:—

H. Wells	£155 0	Poole	£125 3
Osborne	126 0	F. Ranger*	124 10

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H. Wells	£140 0	F. J. Hill	£78 0
Osborne	129 0	F. Ranger	62 0
Poole	124 1		

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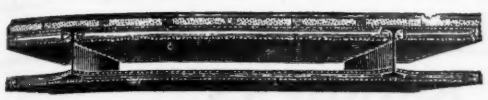

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Institution Prize ..	1895	1896	1897	1898	1899	—	1901
Special Prize	—	—	1897	1898	1899	—	1901
Driver Prize	1895	1896	—	1898	1899	1900	1901
Penfold Silver Medal	1895	1896	—	1898	1899	1900	1901
Penfold Gold Medal	—	—	—	—	1899	1900	—
Crawter Prize	—	—	—	1898	—	—	1901

NOTE.—In 1898 the Crawter Prize was divided between two bracketted winners, one of whom was prepared by Mr. PARRY.

The above table shows that of the 42 prizes awarded at the last seven Examinations, 25½ were obtained by candidates prepared by Mr. PARRY, and 16½ by candidates not prepared by him.

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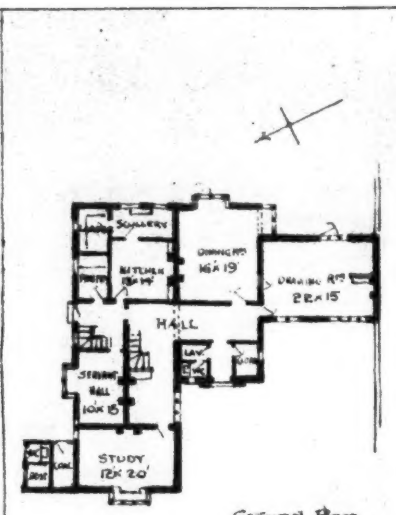

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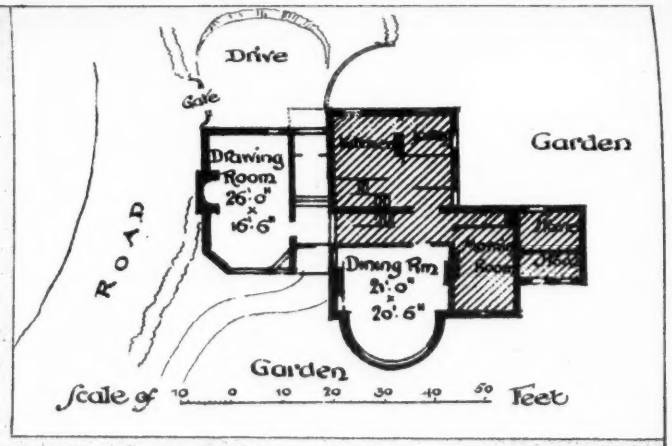

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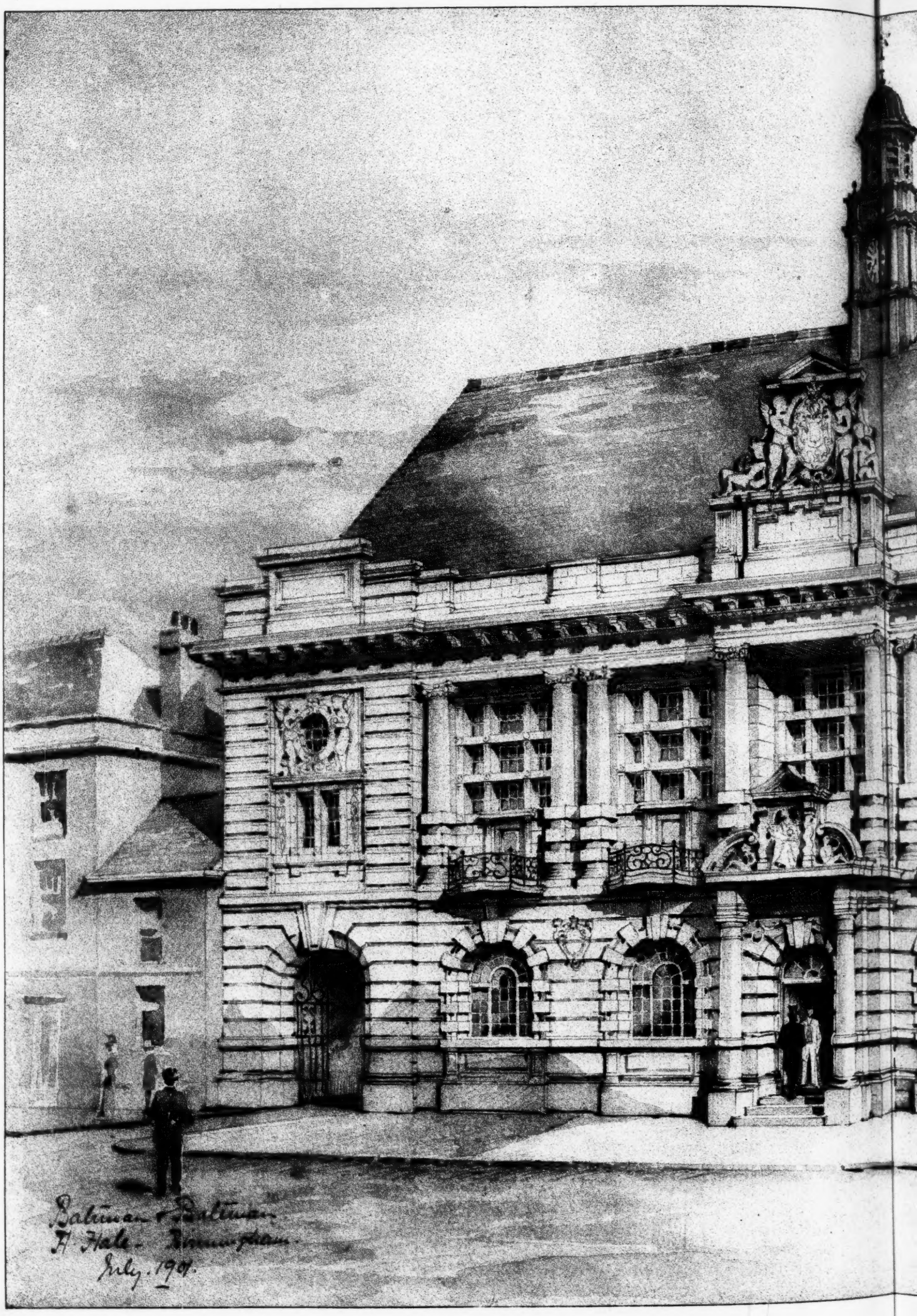

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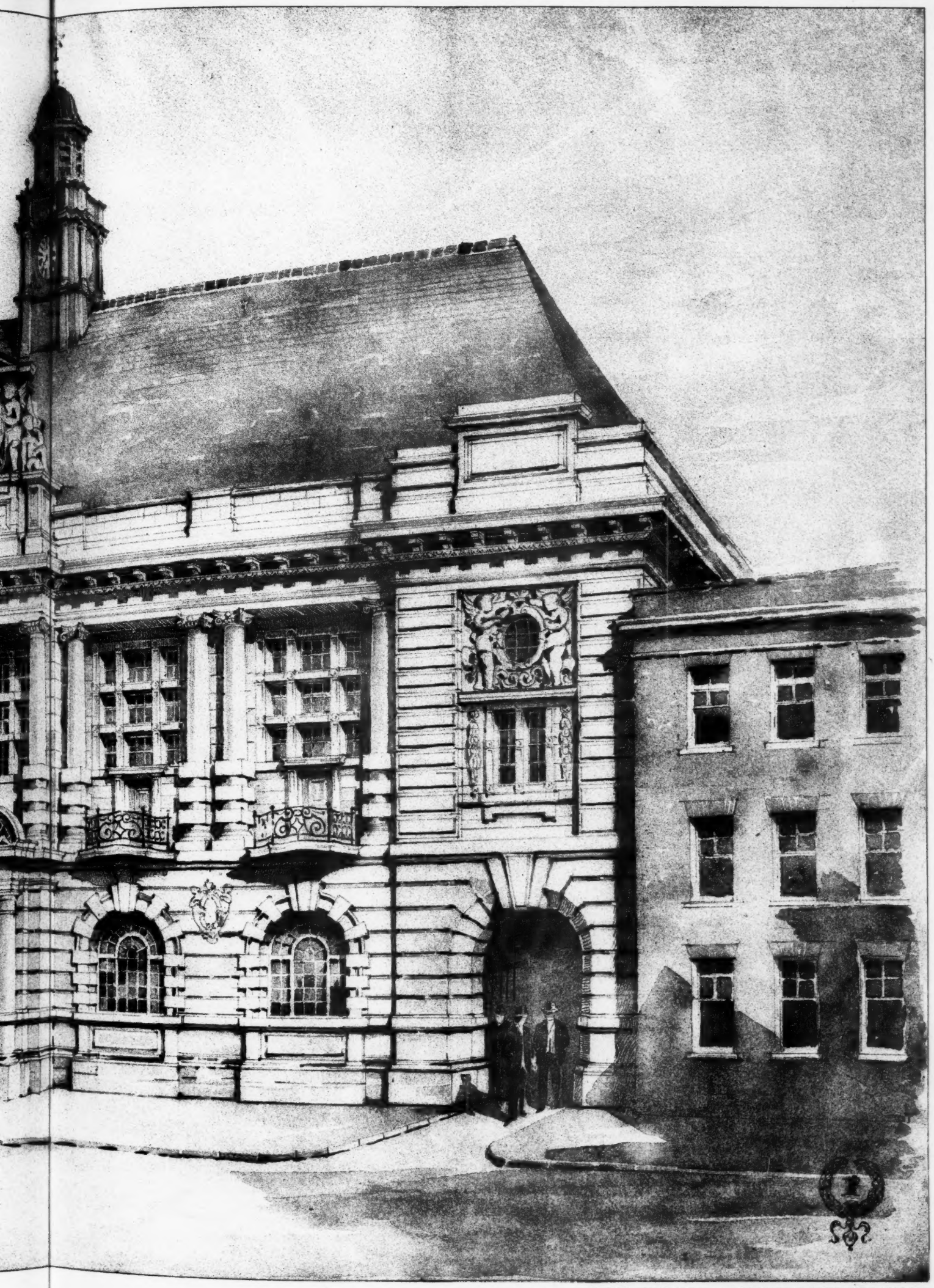

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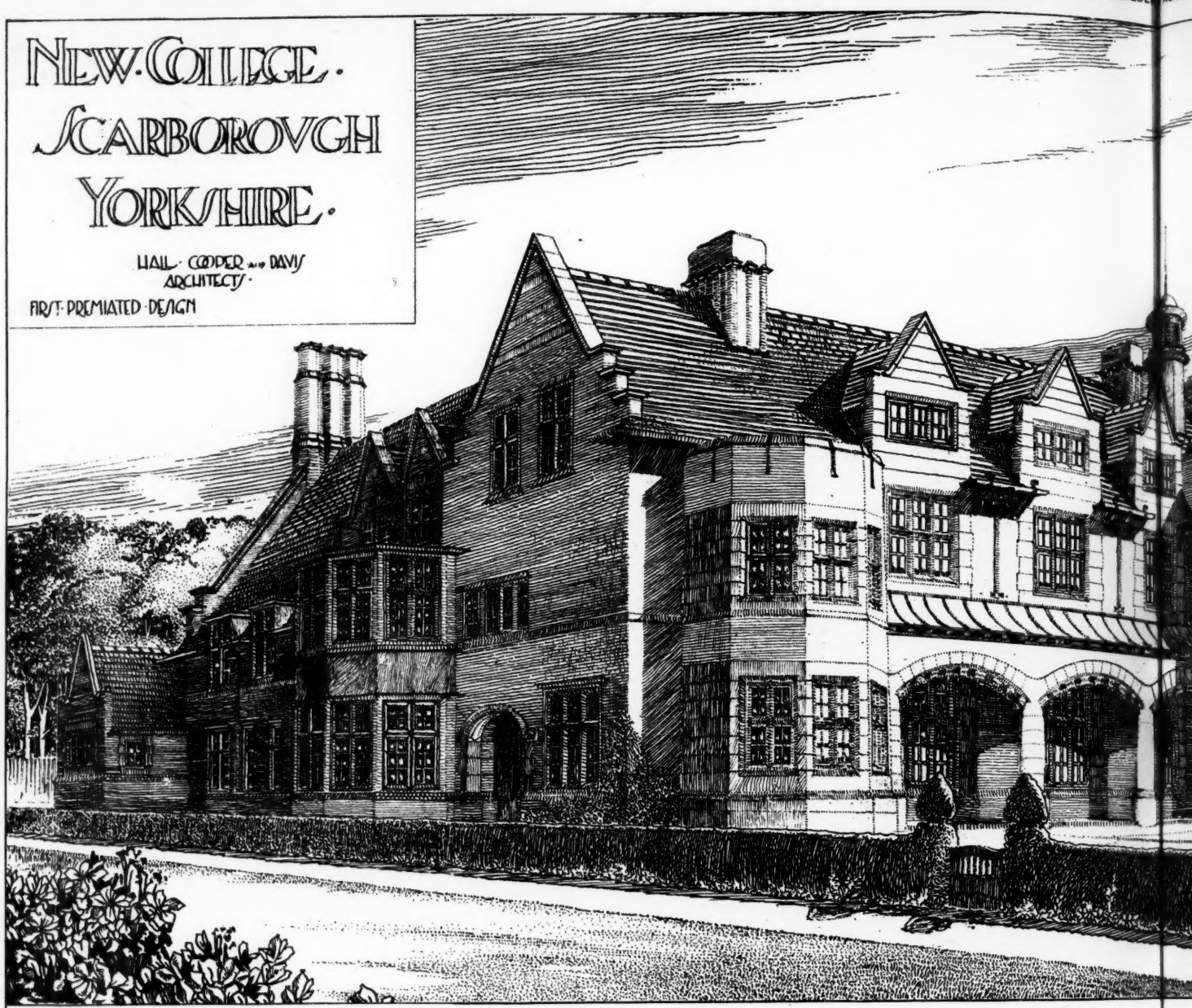

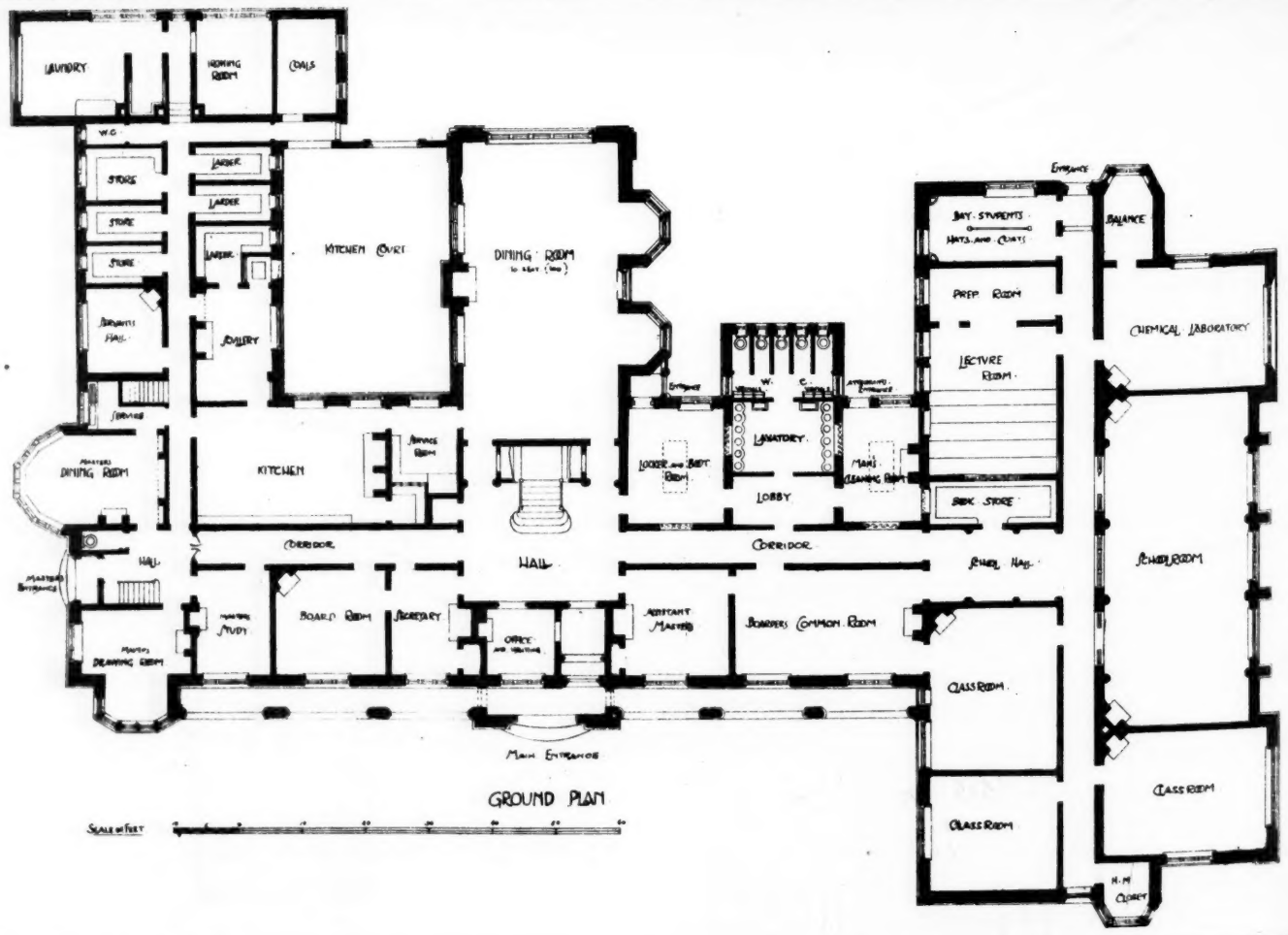

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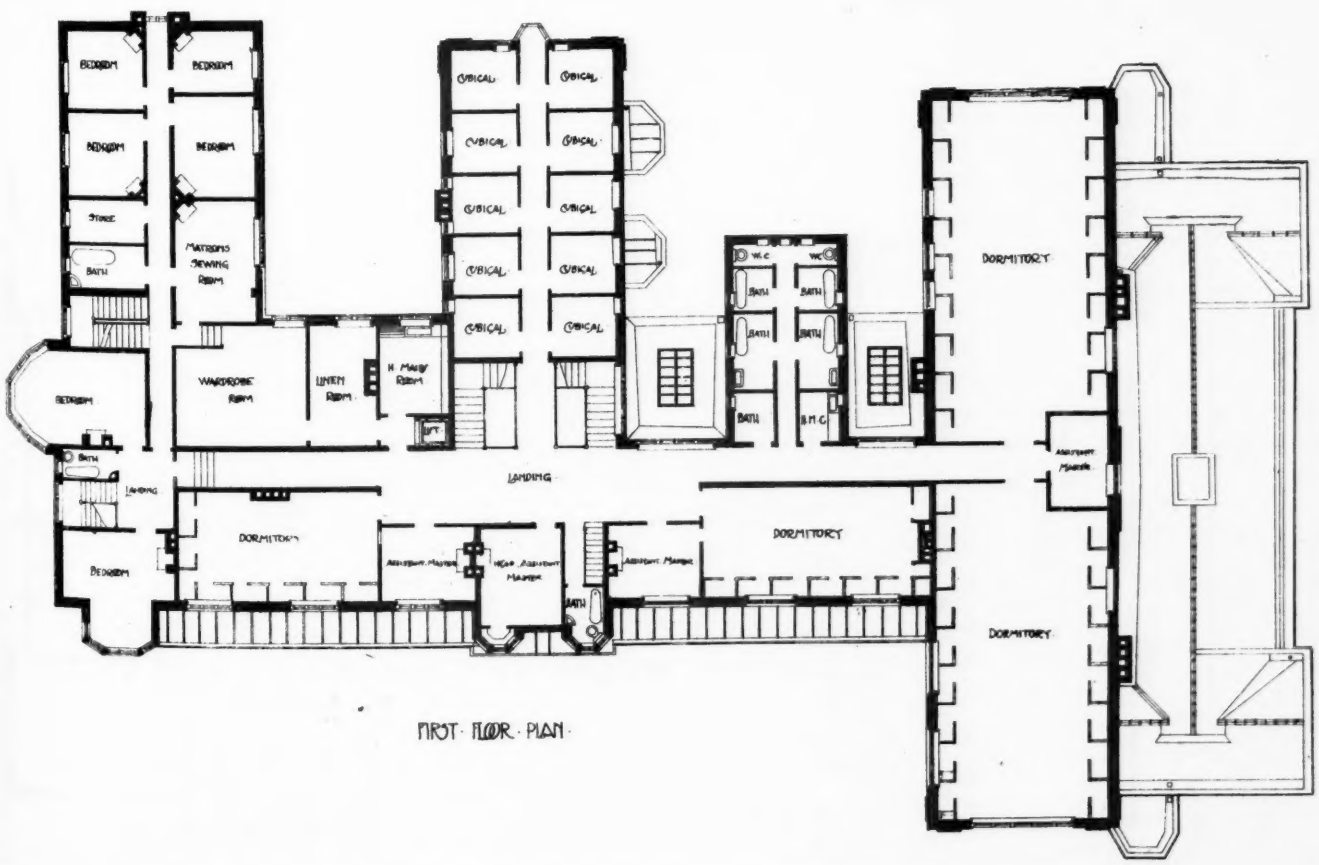

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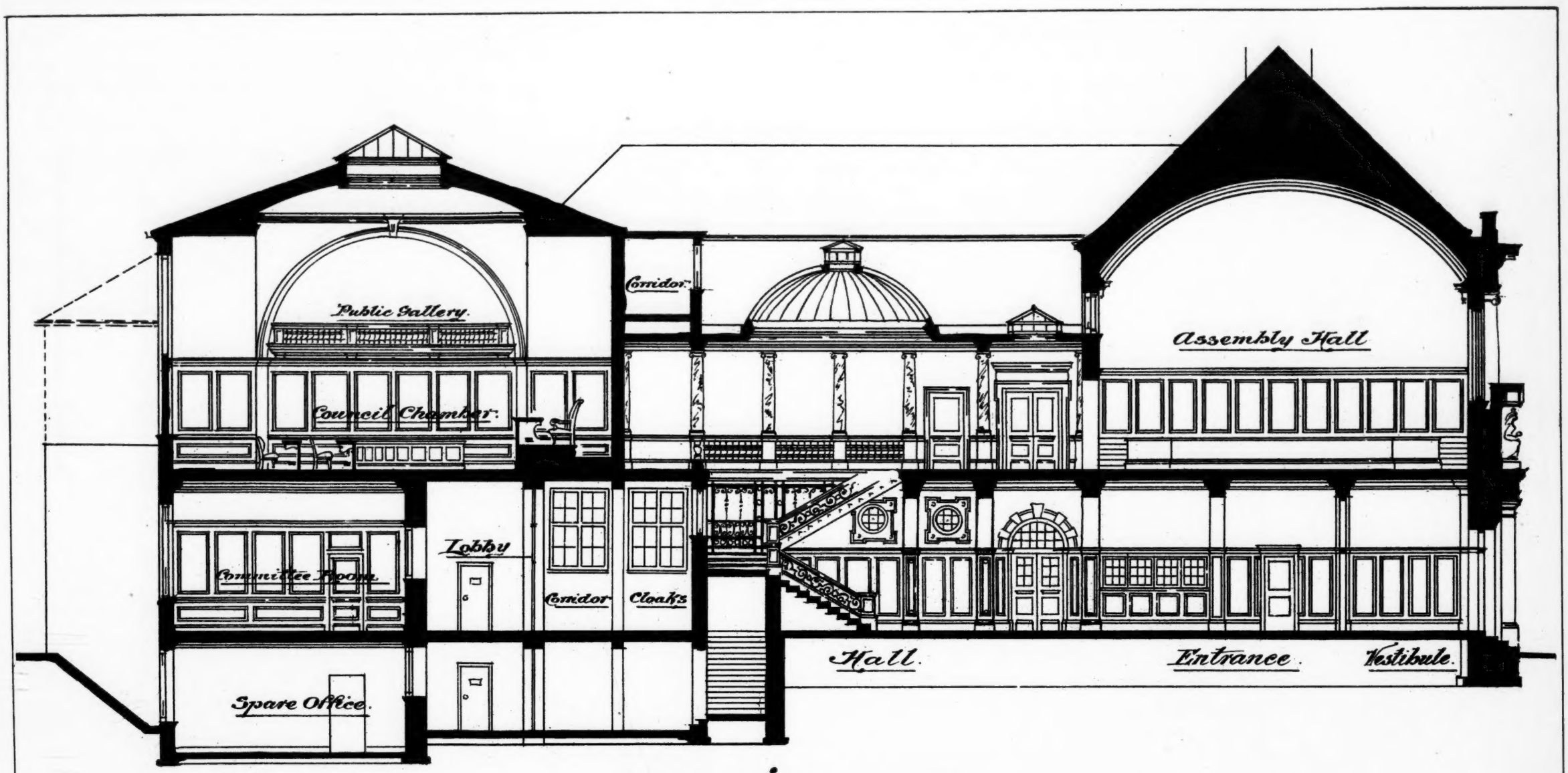

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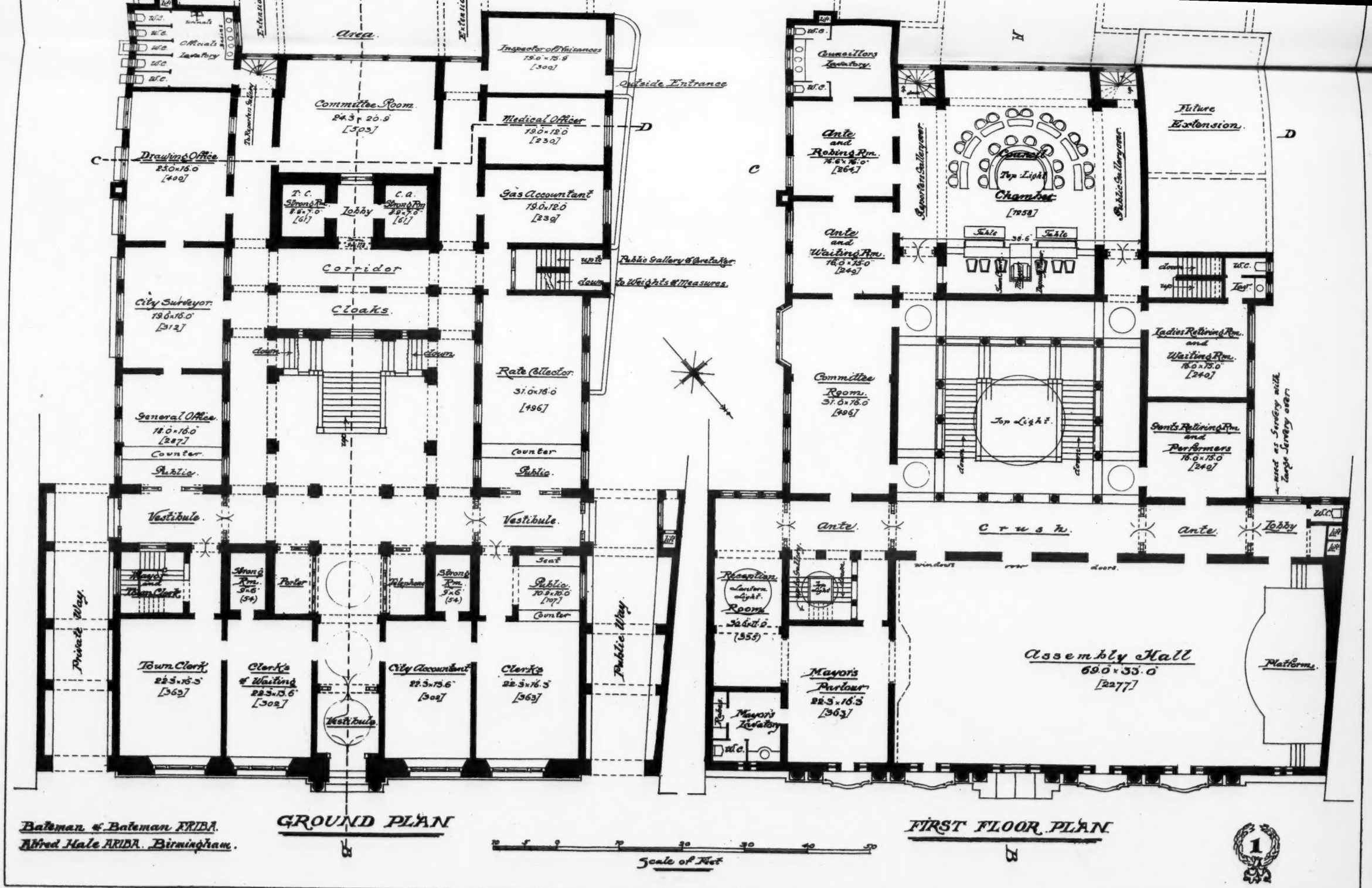

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